WESTERN GAS

ebruary
1927

20 Cents
the Copy

Artist's drawing of the Public Service Building now in course of construction in Portland, Ore. It will house the offices of three public utility organizations in that community.

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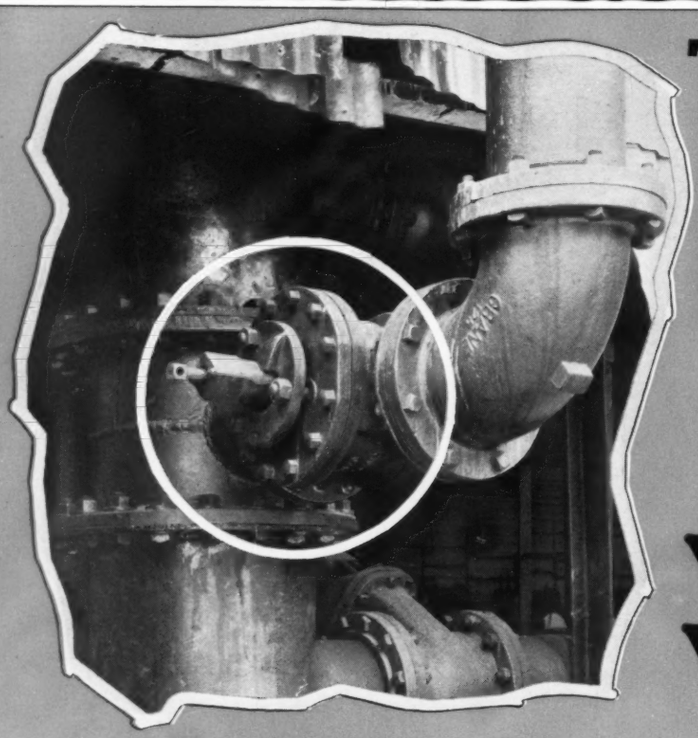
A MONTHLY JOURNAL DEVOTED TO THE
WESTERN GAS & APPLIANCE INDUSTRIES



This is the valve that *enforces safety*

Won't Stick
Won't Leak

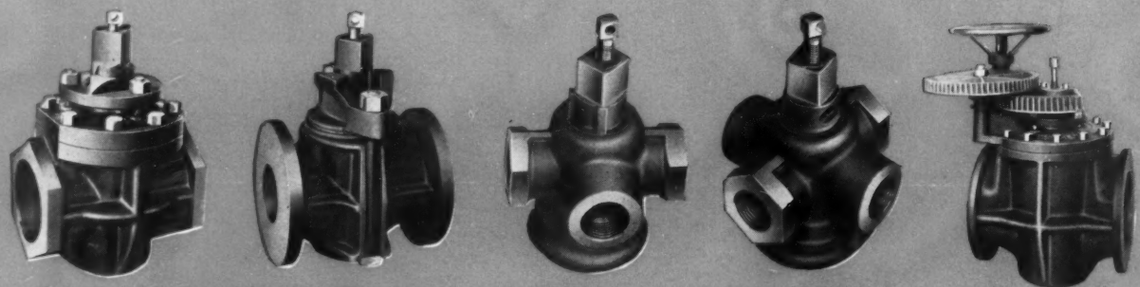
In Merco Nordstrom Plug Valves positive lubrication eliminates sticking. A slight turn of a set screw forces lubricant under pressure through a hole in the plug, down through two grooves to a chamber beneath, causing the plug to be raised. Highly recommended for governor pits, by-pass lines, fire control or service lines, curb cocks, gas and steam lines, tar and ammonia lines, spray and acid lines, cooling coils, collection and distribution lines—in fact wherever dependable valves are required. Request catalog.

MERCO NORDSTROM VALVE COMPANY

SUBSIDIARY OF THE MERRILL COMPANY

Engineers— MERCO *Manufacturers*

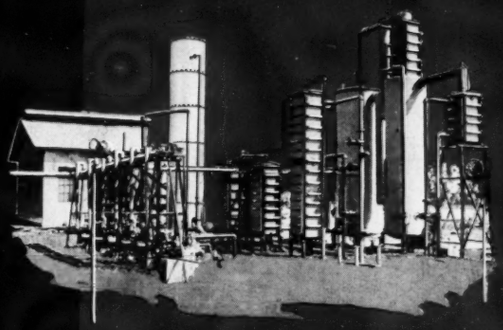
San Francisco, 121 Second Street · New York, 110 W. 40th Street · Chicago, Peoples Gas Building · Houston, 613 Washington Avenue · Cleveland, 325 Engineers Building · *Agencies in Principal Cities*



No. 154—Screwed · No. 205—Flanged · No. 922—Three-way · No. 962—Four-way · No. 150—Geared

Merco Nordstrom
PLUG VALVES

SOUTHWESTERN



BUBBLE TOWERS

(PATENTED)

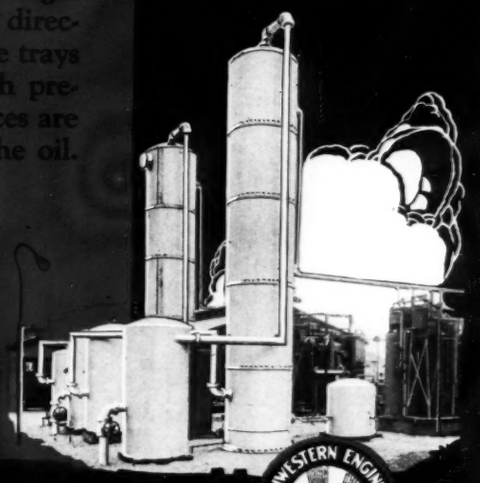
Apparatus of the Improved Bubble Cap Type

ABSORPTION towers are designed for long intimate contact of the oil and gas which flow in counter current directions through the tower. Bubble trays have an equalizing feature which prevents short circuiting. Gas orifices are always sealed by the body of the oil.

Fractionating Towers for Exact Fractionation

Evaporators or vertical stills are designed to strip the oil with the lowest steam consumption.

Complete Information on Request



SOUTHWESTERN ENGINEERING CORP.

1221 HOLLINGSWORTH BLDG.

Los Angeles, Calif.

Offices
TULSA
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WESTERN GAS

626 S. Spring Street,
Phone TUcker 8982
Los Angeles, Calif.

447 Sutter Street
Phone GArfield 5383
San Francisco, Calif.

Official Publication Of The
Pacific Coast Gas Association

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TEEPLE announces the completion of a new plant and installation of new equipment to meet the increasing demand for automatic temperature controls. Six years of constant research and striving to build better, more efficient control equipment has brought about a sound, constant growth. Engineers who have spent years gaining valuable experience in this field are at your service to assist you with your temperature control problems.

The L. R. Teeple Company manufactures complete equipment for the automatic control of gas, steam, hot water, air, oil, or electric heating systems, or for refrigeration control. ¶Industrial plants of all kinds, and homes all over the country are using Teeple Controls and Teeple service. You are invited to write in for details.

L. R. Teeple Company 540 East Ninth Street Portland, Oregon

TEEPLE

TEMPERATURE

TEEPLE *Controls*

Pacific Coast Distributors for Honeywell Heating Specialties Co.

Lampblack

from

Oil-Gas

can be made

Profitable

by using

Oliver-Borden Thickners

and

Oliver Filters

We will gladly tell how

Oliver Continuous Filter Co.

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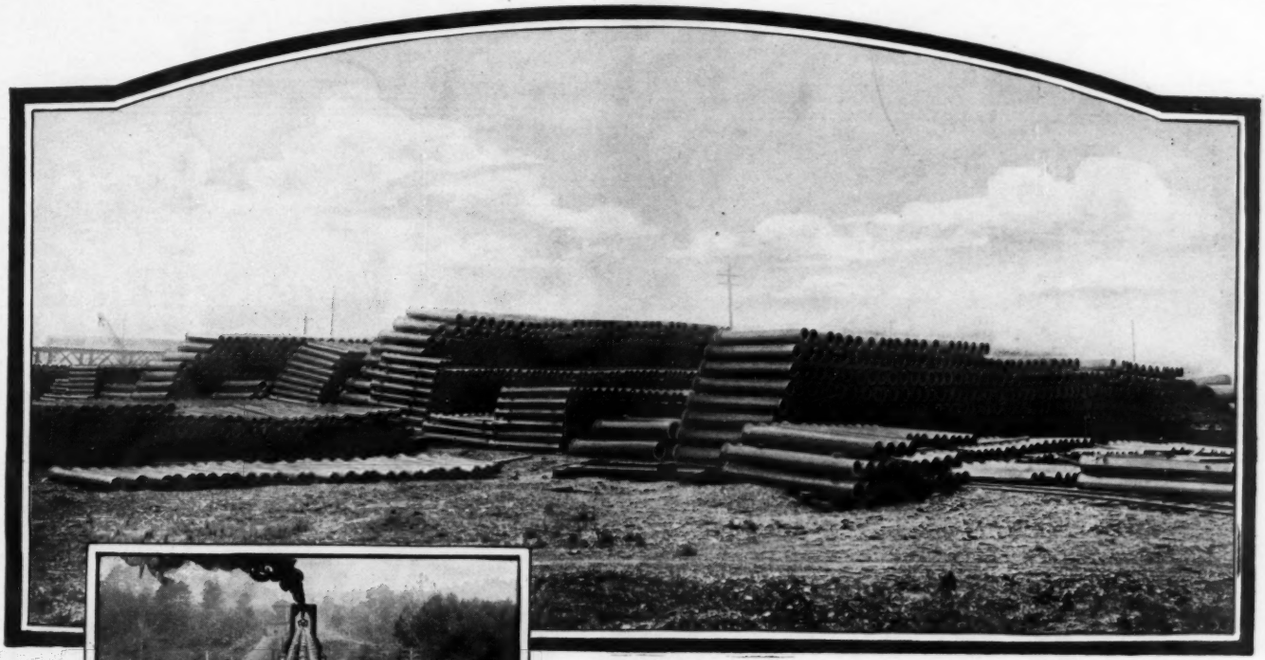
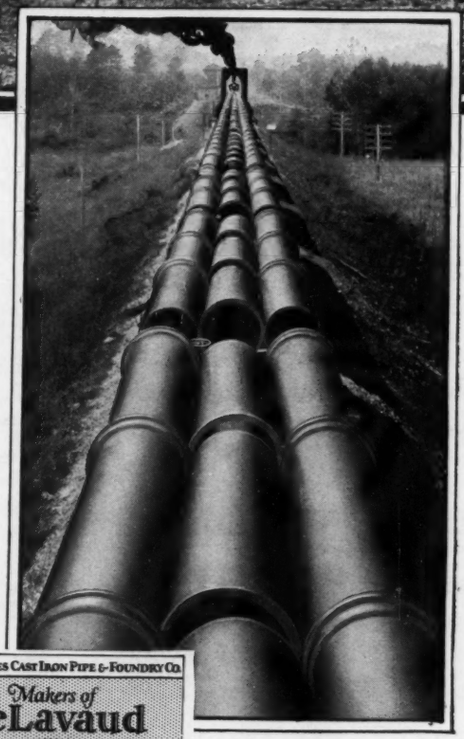


One of our pipe storage yards



A train load of pipe en route

UNITED STATES CAST IRON PIPE & FOUNDRY CO.
Makers of
deLavaud
Centrifugal Cast Iron Pipe

U. S. Cast Iron Pipe Foundries are built for mass production

EVERYTHING possible is done to insure early delivery of even the largest contract orders.

Stocks of standard sizes are maintained at our various yards—orders calling for special material are handled promptly. We also have unusual shipping facilities for rail, barge or boat shipment.

Write for U. S. Cast Iron Pipe handbook which contains all the necessary data on specifications

United States Cast Iron Pipe and Foundry Company

General Offices:
Burlington, New Jersey

SALES OFFICES

Philadelphia: 1421 Chestnut St.
Chicago: 122 So. Michigan Blvd.
Birmingham: 1st Ave. & 20th St.
Buffalo: 957 East Ferry Street
Cleveland: 1150 East 26th Street
New York: 71 Broadway
San Francisco: 3rd & Market Sts.
Pittsburgh: 6th & Smithfield Sts.
Dallas: Akard & Commerce Sts.
Kansas City: 13th & Locust Sts.
Minneapolis: 6th St. & Hennepin Ave.

Seventy Years of Service to the Industry

BETWEEN the years 1850 and 1888 several meter manufacturing establishments were founded in various parts of the country, following the lead of the Phoenix Meter Company and other early firms.

During this active industrial period of American history when the foundations of many of the great business houses and manufacturing establishments were being laid, the American Meter Company was founded.

A factory was erected in Baltimore, Md., and during the succeeding years other factories and branches were established in various leading cities of the country.

This large institution, national in scope, is in a position to render efficient and economical service to its patrons. A specialist in an age of specialization, the American Meter Company keeps abreast of the development of the highly technical meter business. Its factories have successfully filled the great need for meters for nearly seventy years—a fact which in itself bespeaks a business well founded.

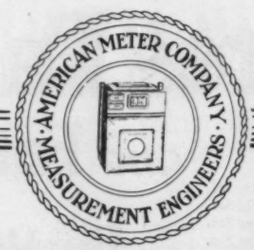
Pacfic Meter Works

of the
American Meter Company, Inc.
Northwestern Representative

SAN FRANCISCO
495 Eleventh St.

PORTLAND
Northwestern Gas and Electric Equipment Co.

LOS ANGELES
2118 Atlantic St.



If They Ask You?

Suppose your own company is considering the installation of gas engine driven compressors and you are asked for your recommendation on the equipment to install.

It will be to your interests if you can make a recommendation for which you need never have to apologize. The man is fortunate who can always feel sure of his choice when such an opportunity comes.

Men in position to make such recommendations more frequently recommend Cooper equipment. Either their own experience or the experience of men they know has demonstrated Cooper compressors and Cooper service to be so thoroughly dependable.

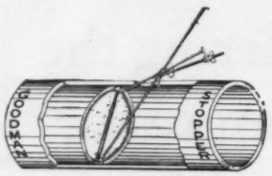
THE C. & G. COOPER COMPANY, MT. VERNON, OHIO

1605 Kirby Bldg., Dallas **504 Kennedy Bldg. Tulsa**

649 South Olive Street, Los Angeles

COOPER

GOODMAN *IMPROVED* SAFETY GAS MAIN STOPPER



The genuine Goodman Stopper is instantly recognized by the name Goodman which appears on the Improved Patented Locking Sleeve. All genuine Goodman Stoppers are now equipped with this sleeve. Efficient as the Goodman Stopper has always been, the new locking sleeve makes the shut-off still more effective and positive. Stopper cannot slip—gas cannot pass.

All sizes 3 inches to 48 inches in stock. Special sizes on short notice.

SAFETY SERVICE PLUGS

Type "A"

Expansion Plug which fits into the bottom of the service tee and is quickly expanded by turning the wing nut which securely shuts off all gas. Sizes ¾" to 4"..

Type "B"

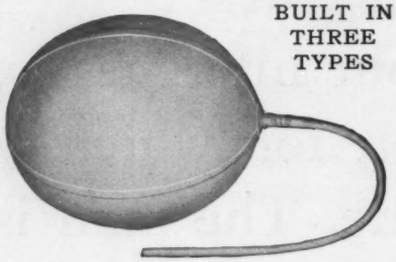
One piece Rubber Plug, taper shaped. Can be quickly applied to service tee. Fits wedge like and prevents gas escaping. Sizes ¾" to 4".

AIR LINE MASK

With or Without Blower

Dependable Gas Main Bags

BUILT IN THREE TYPES



Type A—Invisible Seams or Seamless Bag.

Type B—Reinforced Seams—heavier and stronger than Type A.

Type C—Canvas Covered Bags for use in mains coated with tar or oil.

When ordering specify type desired.

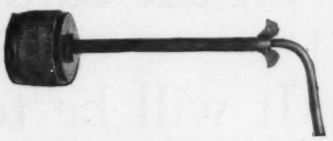
All Goods Sent on Approval

SOAP TAPE

A convenience to have on hand when searching for leaks in mains or services.

Strips 2", 4", 6" and 8" wide each, 40 ft. in length. Put up in sealed containers. Sample sent on request.

EXPANSION PLUGS FOR GAS MAINS



Fits inside diameter of pipe. Long shank reaches inside past the hub. Can be used in either hub or spigot ends. Standard sizes to 16".

"U" GAUGES

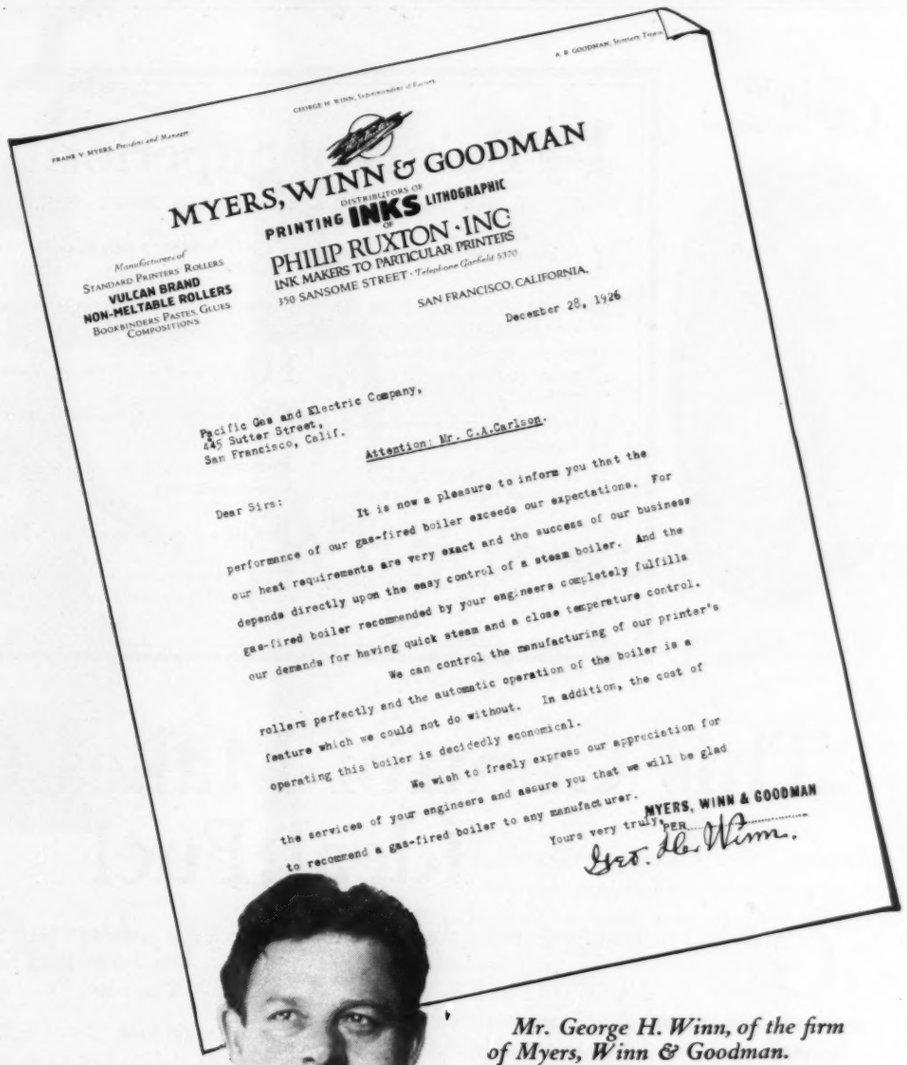
Portable Pressure Gauge for Distribution Men, Complaint Men, or around the Works.

SAFETY GAS MAIN STOPPER CO.

Pacific Coast Representative: C. B. BABCOCK CO., San Francisco

Cable Address: GASTOPPER, N. Y.

523 Atlantic Ave. **Brooklyn, N. Y.**



MYERS, WINN & GOODMAN

DISTRIBUTORS OF PRINTING INKS OF LITHOGRAPHIC PHILIP RUXTON · INC
INK MAKERS TO PARTICULAR PRINTERS
330 SANSOME STREET · Telephone Garfield 5370

Manufacturers of STANDARD PRINTERS ROLLERS VULCAN BRAND NON-MELTABLE ROLLERS BOOKBINDERS PASTES, GLUES COMPOSITIONS

SAN FRANCISCO, CALIFORNIA.

December 28, 1926

Pacific Gas and Electric Company,
445 Sutter Street,
San Francisco, Calif.

Attention: Mr. C.A.Carlson.

Dear Sirs:

It is now a pleasure to inform you that the performance of our gas-fired boiler exceeds our expectations. For our heat requirements are very exact and the success of our business depends directly upon the easy control of a steam boiler. And the gas-fired boiler recommended by your engineers completely fulfills our demands for having quick steam and a close temperature control.

We can control the manufacturing of our printer's rollers perfectly and the automatic operation of the boiler is a feature which we could not do without. In addition, the cost of operating this boiler is decidedly economical.

We wish to freely express our appreciation for the services of your engineers and assure you that we will be glad to recommend a gas-fired boiler to any manufacturer.

Yours very truly,
MYERS, WINN & GOODMAN
PER Geo. H. Winn.

Our gas-fired boiler exceeds expectations

Mr. George H. Winn, of the firm of Myers, Winn & Goodman.

With all of Mr. Winn's twenty-five years' experience in making printers' rollers, he has never before been able to produce as fine and as durable printers' rollers as he is making today. His increasing business testifies to this fact.

That's the first statement in the above letter in reply to a question—Are you satisfied with your gas-fired boiler after using it for a year and a half?

And the letter reproduced here is from a company that knows a gas-fired boiler is easy to control, can be closely regulated and gets up steam quickly.

P G and E engineers will serve you

The same engineering service that helped the above manufacturer is also yours for the asking. Just phone or write to the nearest P G and E office. The engineers have information available on industrial heating operations which have been conducted successfully for many years. This service is at your command without cost or obligation on your part.

PACIFIC GAS AND ELECTRIC COMPANY
P·G·and E·
Owned · Operated · Managed
by Californians

IF IT'S DONE WITH HEAT, YOU CAN DO IT BETTER WITH GAS

THE Erickson TEL-O-STAT

Illustration is two-thirds actual size.

14 Points of Superiority

OF THE ERICKSON GAS-O-TROL

1. It has all metal seat construction.
2. Is rust proof, gas-resisting, and non-corrosive.
3. No overheating the home—provides uniform, healthful temperature.
4. No guessing at temperature—no forgetting to remember.
5. It may be operated with Tel-o-stat, push button or Thermostat.
6. It is fully protected by broad, fundamental patents.
7. It is small, simple, and compact.
8. Is leakless, packless, and noiseless.
9. It is backed by an unconditional guarantee.
10. The watch dog of your gas meter.
11. It is self-cleaning and snap-acting.
12. Is neat and durable—will last indefinitely.
13. It is a means to economy.
14. It has a multitude of applications, public, domestic and industrial.

THE Erickson GAS-O-TROL

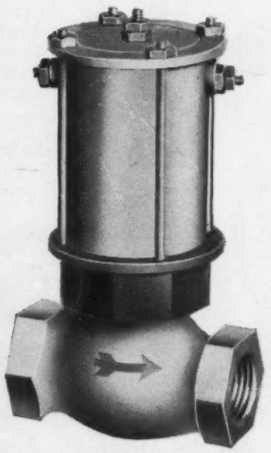


Illustration is one-half actual size of 3/8-inch valve.

This Control Makes Gas the Ideal Fuel

GAS has long been recognized as the ideal quick-acting heat and for years has been used extensively for cooking and for industrial purposes where there was an operator constantly on watch. With the aid of scientific instruments for controlling the regulation of gas, it is becoming recognized as the most efficient fuel obtainable for all purposes.

The Erickson Gas-o-trol is a simple electrically-operated gas valve controlled by an Erickson Tel-o-stat placed at a remote point. It provides a positive control of the gas flow and thus makes it possible to use gas for heating with perfect safety and the greatest economy. The Erickson Gas-o-trol is made in sizes that fit most any requirement. The 3/8-inch size passes 100 feet of gas per hour, the 1/2-inch size passes 150 feet, and the 3/4-inch size passes 250 feet. It is also made in larger sizes to accommodate any required capacity.

The Erickson Tel-o-stat is the latest development in a moderately priced room thermostat. Placed wherever desired in the home, it actuates the Erickson Gas-o-trol on the furnace. Besides being of an attractive design, the Erickson Tel-o-stat features a signal light which tells when the furnace is burning. It is also equipped with a complete cut-off switch for use at night or during prolonged absence. The indicator is set for any desired degree of temperature and the Gas-o-trol maintains this temperature uniformly by turning the flow of gas off and on as the temperature in the home rises or falls, resulting in a substantial saving of gas.

We are Pacific Coast distributors for

The "MINNEAPOLIS" HEAT REGULATOR

ARTHUR F. ERICKSON COMPANY

SELLING BUILDING, PORTLAND, OREGON

Branches or Major Dealers with Stocks in all Principal Pacific Coast Cities

Mueller Gas Tapping Machine "H"

Where gas goes

this machine breaks the way

"If it can be done with heat, it can be done *better* with gas"—and in tapping the way for a wider use of gas, you can do it better with the Mueller Tapping Machine—and more quickly—and at less cost.

This modern gas tapping machine has every feature to make for rapid, efficient operation—ratchet handle and other devices that permit making taps 3/8 to 2 inches in record time and with the least physical effort. It is a handy machine, and one that will withstand abuse on the job.

Tapping Machine "H" is regularly furnished with detachable gas cylinder and rubber saddles, and can be used either on open pipe or on pipe under pressure. A special oiling device permits oiling of the tool while the machine is in operation. Thorough testing at the factory insures that the machine will stand up under more severe conditions than it will ever be called upon to meet in actual use.

In *saving* both time and labor, this machine will quickly pay for itself and materially reduce your costs. Write for detailed descriptions and prices of this and other Mueller Gas Tapping Machines.

Many leading gas companies throughout the country use Mueller Gas Brass Goods because through actual service they have established a reputation for dependability. Write for a catalog of products for gas companies.

MUELLER

MUELLER CO.

(ESTABLISHED 1857)

San Francisco: 1072-76 Howard St. 2468 Hunter St., Los Angeles
Factories: Decatur, Illinois; Port Huron, Michigan
Canadian Factory: MUELLER, Limited, Sarnia.

What share of your business *comes* to you.....?

Most dealers in the specialty gas appliance business have to get out and "hustle" for business. It takes a long time to build up a reputation that brings the profitable "drop in" business.

That's where Pacific Gas Heating dealers have a big advantage. They quickly become known as gas heating headquarters for everyone knows that they carry a **complete** line of every type of gas heating appliance—a type to fill every conceivable heating need.

With so many types to choose from, builders son learn to come to Pacific Gas Heating headquarters where you can give them unbiased advice on which type best suits their need.

The Pacific line is well advertised and well-known. It is backed by the largest manufacturer of gas heating appliances in the West. Other Pacific dealers are making money—getting the bulk of business in their territories. But there are lots of territories open yet.

If you will drop us a line, we will show you how to make more money.

Pacific Gas Radiator

Gas Heating Company Headquarters

Manufacturers and Wholesalers of Pacific Gas Heating Appliances
Factory at Roseberry and Walter Sts., Huntington Park, Calif.
Agencies Throughout the West

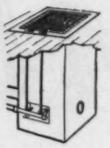
Gas-Steam Radiators

Dual Pipeless Furnaces

Wall and Fireplace Heaters

All Vented for Healthful Heat

Gas Radiators—Pressed Metal and Cast Iron


Pipeless Floor Furnaces

Unit Basement Furnace Systems

Manufacturers of Every Type of Gas Heating Appliance

An English Type Home Calls for an English Type of

The HUMPHREY Radiantfire

Reliable estimates of the amount of home-construction that will take place in the United States during 1927 show that millions upon millions of dollars will be spent.

English homes, Spanish homes, Italian homes, Colonial homes—homes in period architecture of all kinds, will be built—many of them right in your locality.

The owners of these homes seek the things that are appropriate. In the extensive Humphrey Radiantfire line are many authentic and beautiful period designs, made especially for period homes.

Cultivate **your** market for Radiantfires of period design among the owners and builders of homes of period architecture. There are more and more of them every year.

The HUMPHREY Radiantfire

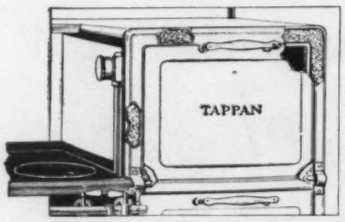
REGISTERED TRADE MARK

Manufactured by
General Gas Light Company
Kalamazoo, Mich.

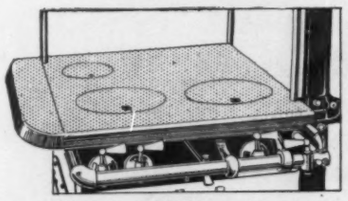
Pacific Coast Representative
C. B. Babcock
135 Bluxome Street, San Francisco

5 Definite Advantages of the Tappan Insulated Oven—

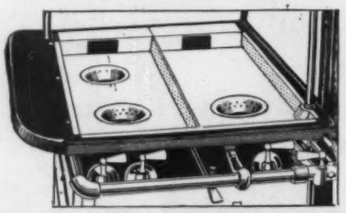
and every one a strong selling point!



The TAPPAN oven is insulated with 25 lbs. of mineral wool, yet it is completely ventilated. The heat is kept in the oven; your kitchen is always comfortable, and half the gas is saved.



The TAPPAN solid top is made of oil-tempered, satin-finished cast iron. It will not stain or discolor, and is easy to keep clean.



The bowl burners under the TAPPAN solid top are scientifically designed for most efficient, labor-saving cooking. The combustion chamber greatly increases the heat-efficiency of the fuel. It saves gas.

1. **Saves fuel.**
2. **Bakes better.**
3. **Makes baking-control easier.**
4. **Holds the heat in the oven.**
5. **Keeps the Kitchen comfortable.**

Just as an oil filter, an air cleaner, four-wheel brakes, and so on, are advantages which make an automobile more desirable in a man's eyes, so the improvements brought about by the TAPPAN Insulated Oven gas range make it more desirable to a woman. Especially since the TAPPAN costs no more.

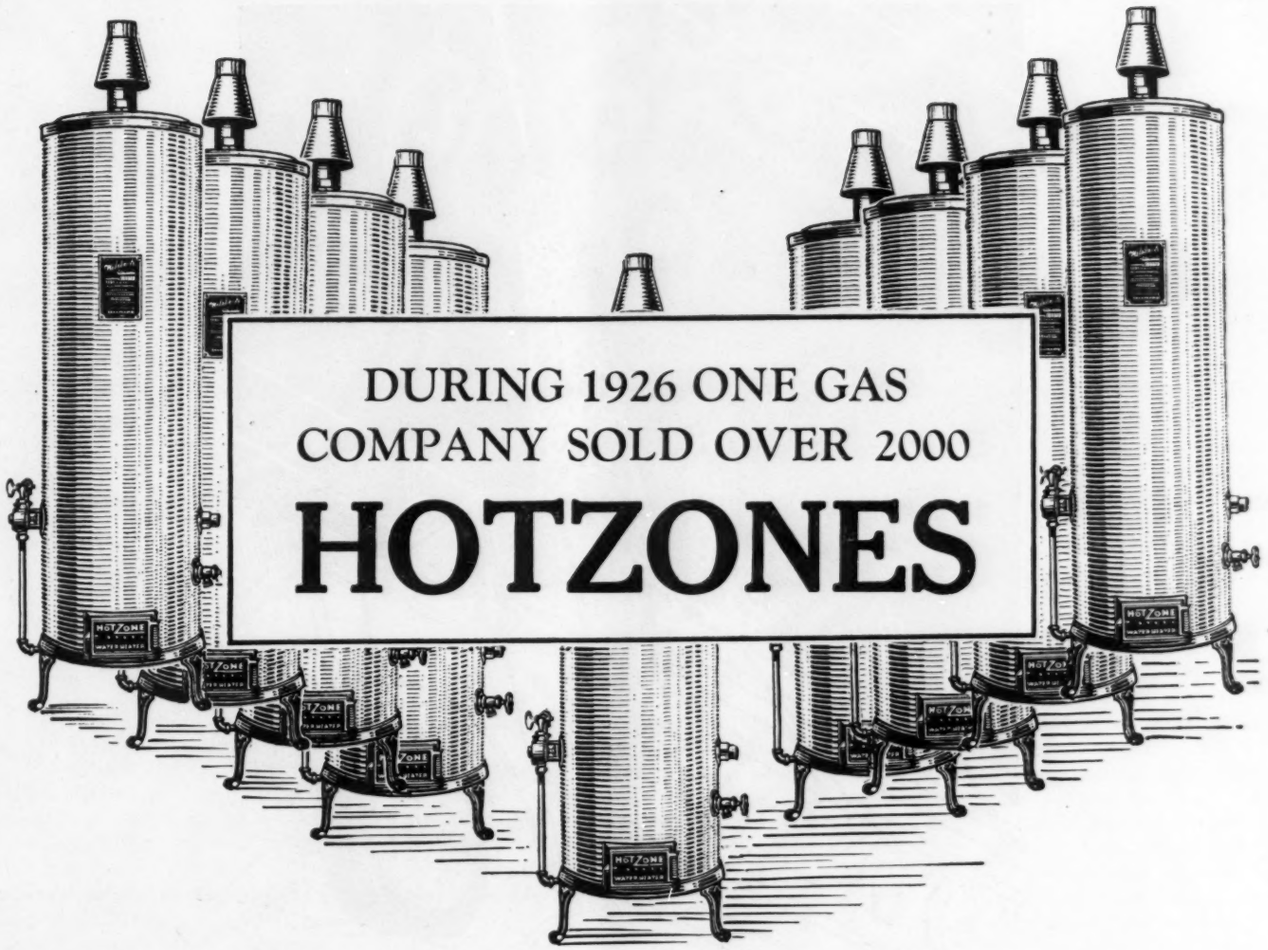
TAPPAN INSULATED OVEN GAS RANGE

TAPPAN STOVE COMPANY

Pacific Coast Office
665 Howard Street—San Francisco

H. R. BASFORD COMPANY
Direct Factory Representatives
Northern California—Nevada—Hawaii
665 Howard St.—San Francisco

H. R. MAYER
Direct Factory Representative
Southern California—Arizona
1001 East First St.—Los Angeles



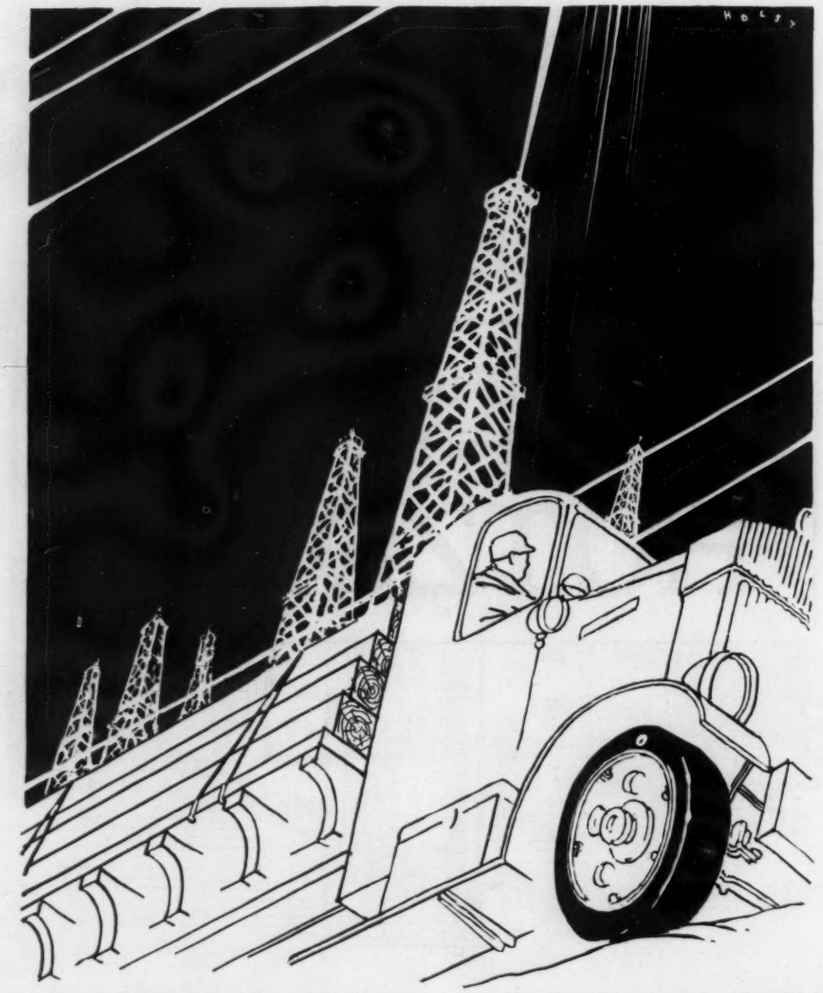
With NEW LOWER PRICES to you and no change in quality, sales opportunities this year will be greater. Get your share of HOTZONE Water Heater business.

Write for Information

WELSBACH COMPANY
GLOUCESTER, N. J.
Branches in Principal Cities
San Francisco Office: 863-865 Mission Street

Member American Gas Association ***Member Natural Gas Association***

Welsbach



The economical advantages of Goodyear Tires and TRUCK TIRE SERVICE to the operators of trucks engaged in the various forms of hauling peculiar to the gas industry are numerous. Perhaps the most outstanding advantage is found in the fact that this combination makes possible greater dividends from the tire investment through uninterrupted service..... lower upkeep costs..... and longer tire life.

"A Tire for Every Need"

Truck Tire Service Co.

HOLLYWOOD
6523-Santa Monica Blvd.
Telephone HO-5524

LONG BEACH
220-East Anaheim
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LOS ANGELES CALIFORNIA

WESTERN GAS

A Monthly Journal of the Gas, Gas Appliance and Natural Gasoline Industries in *Western America*

1926 Gas Records *in* West Show Gains *as* 1927 Expansion *Is* Planned

By GEORGE H. FINLEY

Managing Editor, WESTERN GAS

NOW that 1927 has gotten well into its stride there is time to look back and cast up the record for 1926, to see whether this twelve-month period measured up to its predecessors, whether it fell below, or whether it surpassed previous high marks of achievement set by the gas industry.

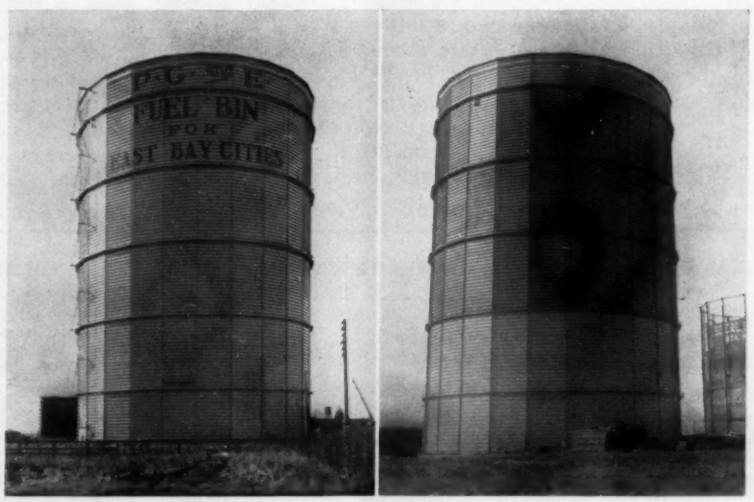
For the country as a whole there is no room for doubt that 1926 was the banner year to date. Statisticians of the American Gas Association tell us that manufactured gas sales were greater by 38 billion cubic feet than those of 1925--459,326,000,000 cu. ft. being the grand total of manufactured gas sales last year. This increase, the Association tells us, is almost twice as great as the increase the 1925 record showed over 1924, and is almost as great as the increase shown in the three years 1920-21-22 lumped together. Not only was 1926 a good year—the best yet—but the splendid record made in extension of service to new consumers means that the industry has in the past year builded foundations for greater sendouts in the future. New customers to the number of 400,000 were added to the lines of companies serving manufactured gas, which represents a four per cent increase, and raises the total of the manufactured gas industry's consumers to 11,000,000.

Gross revenues from the sale of gas might be expected to hit new levels, and this was the case. A new high total of $491,776,000, which is an increase of $39,776,000, was set up from gas sales, and in this figure there is no account taken of revenues derived from sale of by-products of gas manufacture; these revenues are correspondingly high.

Such specific information as the above is not available for the natural gas industry. However, it is not needed to convince any observer of current events, even a casual observer, that the natural gas industry is going ahead. Gas trade publications, oil publications, and the daily papers are full of pipeline projects, in the Mid-Continent, in California and elsewhere. Gas conservation is now a live issue, wherever drilling operations proceed; natural gas utilization grows apace, with house-heating and industrial utilization in the van.

A. B. Macbeth, president of the American Gas Association and a past president of the Natural Gas Association of America, gives us his opinion in a personal expression to the writer that the natural gas industry's record of progress in 1926, and its expectations for 1927, are entirely encouraging.

On the other side of the 1926 picture is 1927, which has already begun auspiciously. Will 1927 see the curve of gas progress start on a downward slant, or will it climb to new peaks? Perhaps one opinion is as good as another, at this early writing. But from our contacts with leaders in the western gas industry, our personal conclusion is that 1927 will see a continued prosperity for gas utilities, especially in the West. Certainly there is no room for pessimism in the gas man's mind. While the best of expert business opinion seems to forecast a some-



These two waterless gas holders, each of 10,000,000 cu. ft. capacity, are typical of the many modern additions made in 1926 to the West's equipment for efficient gas service. Left: New Oakland holder of the Pacific Gas and Electric Company. Right: So. Calif. Gas Co.'s new holder, at Los Angeles.

what abated general prosperity, there is no expectation of marked depression; and the gas industry has builded too soundly to be greatly affected by minor ups and downs of general business. Our product is in no sense a luxury, and the diversity of uses to which it is put is the best kind of prosperity insurance. Slumps in the industrial load will find offset in gains from domestic uses. Especially is this true in view of the new popularity of house-heating, and the near-at-hand popularity of refrigeration by gas, and gas incineration. These things will not come of themselves, it is true, but *Western Gas,* for one, believes that the gas industry is prepared to "go to the bat" for these new applications of our product. It will be necessary to modify and amplify our sales structure to accomplish the desired result, but this must come if we are to make effective headway against competitive fuels.

A few representative opinions of leaders in the gas utility field bear out the general indication of a good year ahead.

Says Alexander Forward, managing director of the American Gas Association; "Prospects are particularly favorable for an enlarged business of substantial proportions in 1927. Basically, the industry was never in better condition to expand in new fields and to further consolidate its position in old ones than at the threshold of this new year."

Quoting John J. O'Brien, president of H. M. Byllesby and Company: "The general managers of the Byllesby properties, operating in nineteen states, report general conditions satisfactory in their respective territories. While in some instances their views of the coming year are cautiously expressed, the majority, particularly in the middle west and on the Pacific Coast, look forward to a very prosperous year."

Speaking for California, Wiggington E. Creed, president of the Pacific Gas and Electric Company, says that "Increasing population and new and added uses for gas will make 1927 another year of progress in the gas industry in California."

In order to bring the record of 1926 out of the field of generalities and into that of definite particulars of progress made in western states, *Western Gas* is again offering its readers the returns from a brief questionnaire circulated among western utilities. We are fortunate in being able to present returns from every major gas company operating in the eleven western states, and a careful reading of the individual records given will enable the reader to get a true picture of the year 1926 in the West. Also, to obtain definite information on some of the major projects contemplated by western gas utilities for 1927.

One fact outstanding in the returns from a majority of the companies is that gas sendouts in the West exceeded those of 1925. This will come as a surprise to some, in spite of the general knowledge that sendouts for the country as a whole were high. For the West has had a year of mild weather, and everyone knows that the curve of gas sendout falls as that of the temperature rises. Portland, Ore., registered a higher average mean temperature in 1926 than in any year since the establishment of its weather bureau, in 1872. Except for some saving cold snaps, in December, the record in Los Angeles was almost as bad, and points in between have had abnormally high temperatures. Yet sendouts generally increased in the West.

This is not to say that 1926 was an unqualified red-letter year with western companies. The story told by money invested in maintenance and additions to gas service facilities is not as creditable as that of 1925, at least as far as concerns dollars expended. It may of course be urged that the investment in betterments in 1925 and the years immediately previous was calculated to cover the needs of 1926. And it may be urged with equal plausibility that the sane expansion program for gas utilities is the gradually expanding service, which permits of more or less immediate earning on new investment. Be this as it may, the returns from the *Western Gas* questionnaire reveal that new investment in gas service facilities was considerable in 1926, though it fell under that of 1925 in many cases.

But let the companies speak for themselves. In the following paragraphs are given in condensed form the answers returned to a brief set of questions regarding current expansion in the western gas industry.

For convenience the returns are given as briefly as possible and are arranged alphabetically by states and cities. Expenditures quoted for 1926 are totals for maintenance and additions, unless otherwise stated. In some cases they are estimates, where the questionnaires were filled out in advance of making up complete company records. The loose term "meters installed" is used in the sense of independent meters. Gas sendout figures are given in most cases instead of gas sales, as sales totals for the year were not as readily available at the date the questionnaires were circulated.

The questionnaire of course is not exhaustive as to contents, nor does it represent every company—it does, however, represent the major operators, as well as a number of smaller utilities. Where companies merchandise gas appliances their sales records for 1926 will be found in the table compiled at the bottom of this page.

EDMONTON, ALBERTA

Northwestern Utilities, Limited, reports a gross expenditure in 1926 of $246,139 for additions and betterments, a decrease of $84,470 from 1925. Distribution lines laid, 1926, 10.75 miles.

Independent meters installed, 1926, 1028. Total meters, January 1, 1927 numbered 7275.

Total 1926 sendout, 1,769,979 M. cu.

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RECORD OF GAS APPLIANCE SALES IN 1926 FOR REPRESENTATIVE WESTERN COMPANIES, INCLUDING ALL OF THE LARGER UTILITIES WHICH SELL APPLIANCES

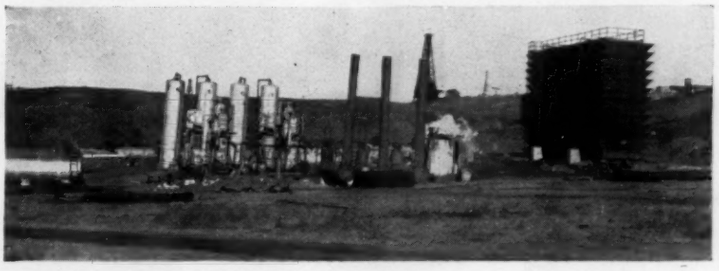
Name of Company—	Ranges	Water Heaters	Space Heaters *Radiant Types*	Space Heaters *Other Types*	Special Burners and Furnaces	Laundry Apparatus
Tucson Gas, Electric Light & Power Co., Tucson, Ariz.	400	300	300	.....	4	18
San Joaquin Light and Power Corp., Fresno, Calif.	171	3	128	7	.....	.....
Southern California Gas Co., Los Angeles, Calif.	1,243	353	842 total both types		400	.....
Southern Counties Gas Co., Los Angeles, Calif.	1,969	177	1,908	92	100	.....
Public Service Company of Colorado, Denver, Colo.	2,000	900	850	75	75	215
The Helena Light & Railway Co., Helena, Mont.	43	10	5	.....	.....	.....
Truckee River Power Co., Reno, Nev.	112	74	8	2	6	.....
Mountain States Power Co., Eugene, Ore.	150	63	41	.....	113	.....
Portland Gas & Coke Co., Portland, Ore.	2,311	2,027	357	81	1,885	553
Puget Sound Gas Co., Everett, Wash.	75	85	2	.....	96	11
Spokane Gas and Fuel Co., Spokane, Wash.	500	300	40	.....	24	100
Tacoma Gas and Fuel Co., Tacoma, Wash.	353	223	213	.....	177	23
Utah Gas & Coke Co., Salt Lake City, Utah	625	298	33	16	261	32
Vancouver Gas Co., Ltd., Vancouver, B. C.	965	872	663	31	100	21

Gas *in the* Texas Panhandle

With Special Reference *to* Natural Gasoline Operating Conditions

By W. L. RIFENBERICK
President, Mutual Gasoline Company

FROM the California operator's standpoint the gas in the Texas Panhandle presents a number of new features. The one most different from California conditions is the excessive hydrogen sulphide content. The water problem is also more serious than in most of the California fields, not alone from the standpoint of hardness but a water supply must be developed in virtually every case. This is done by drilling shallow wells and putting in gas engine pumps to lift the water. It should in all cases be treated by either the zeolite or lime and soda process before being used in the boilers and cooling equipment.



Absorption plant of the Dixon Creek Oil Company, near Borger, Tex., consisting of two 7,500-gallon capacity Southwestern semi-portable units. The topography of the land is very similar to that of the San Joaquin fields of California.

The water as it comes from the wells will scale up the tubes of a cooler in a very short time unless it is softened. In some cases where raw water has been used the tubes have plugged solid. With proper treatment of the water, and by keeping the velocity of the water sufficiently high, scaling can be kept down to a very satisfactory point. In plants using small tube coolers and condensers the scaling trouble is not causing difficulty now.

At first the hydrogen sulphide content was considered to be sufficiently high to give trouble with brass valves and admarilty metal tubes, but very fortunately such is not the case. These metals seem to be able to withstand the hydrogen sulphide remarkably well. The admarilty metal tubes have been able to withstand the corrosive action best of all.

All water lines must be insulated where exposed to the cold weather, and steam connections provided to prevent freezing. It is a safety measure which should not be overlooked or a frozen line will probably result and cause a lot of trouble. Cooling towers should also be connected to discharge the warm water into the basin during freezing weather instead of over the top, to prevent the formation of ice and breaking down the tower.

TREATING THE GASOLINE

One of the greatest troubles experienced was treating the gasoline to produce a sweet and non-corrosive product. The doctor treatment did not produce uniformly sweet gasoline. It might pass the doctor test but not the corrosive test, or vice versa. The same was more or less true of the hypochlorite treatment. Trouble was also experienced with the gasoline turning off color after being sweetened. This was the most difficult thing to overcome. A new process was developed which has solved the problem remarkably well. It is very simple and decidedly cheaper than the older sweetening methods, in addition to producing a sweet non-corrosive gasoline that will keep its color after treatment.

The process consists of taking doctor solution to which sulphur is added, forming a lead sulphide. This black precipitate is used in a closed system and circulated with the sour gasoline through a series of orifices or mixing head to thoroughly contact the two substances. During this time the mixture is agitated with air or gas. The gasoline after treatment goes into a settling tank where the black precipitate is taken back into the treating system for use again while the gasoline is run to storage. In some cases the treated gasoline is washed with water but this is seldom necessary. As a general statement it may be said the cost of treating gasoline with the lead sulphide is from one-third to one-fifth the cost with either the doctor or hypochlorite methods—the reason for the saving being the continued use of the lead sulphide. The makeup is very little and only due to unavoidable losses. The Cal Tex Gasoline Company has been treating its own and Dixon Creek gasoline for some time.

The condition causing the most concern to the operators at the present time is the water. Some wells have gone entirely to water but the operators have hopes of recovering them by replacing the gas pressure to the sands. The water sand is very close to the oil sand and under it. One of the companies advances the theory that as the gas pressure is reduced the pressure in the water sand gradually forces the water upwards until it breaks through the oil sands and into the well. For this reason the gas pressure is being put back on the formation. The wells will be flowed with the gas used to put the pressure on the formation. It is expected the gas pressure will hold the water back and allow the oil to flow into the hole, and only time will tell whether the process will be successful. It looks very logical but it may be difficult to make the water recede, once it has worked its way into the oil sand.

In a portion of the cases water trouble is due to ignorance and negligence on the part of some of the operators. Some of the wells have been given too heavy shots which cracked the formation under the oil allowing the water to rise.

HIGH PRESSURE GAS IS BUGBEAR

The other bugbear is the high pressure gas from the upper sand. The gas with the oil is of a very good quality. It ranges from one gallon to over two gallons in gasoline content, but if the high pressure gas, which is dry, breaks through around the casing, the wet gas is diluted to almost any point.

There are numerous wells in which the gas has broken through to the oil sands. The result is an enormous volume of gas with a gasoline content so low that it is not practical to treat it for recovery of the gasoline. There is sufficient gasoline in the wet gas with the oil to make the treatment highly profitable when the dry gas is not present.

The dry gas presents another situation vastly different from California conditions. The market in the Panhandle is decidedly limited. The city of Amarillo is the only domestic load. One of

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1926 Christmas sale displays at Southern Counties Gas Co. District Offices

Upper left: San Pedro; right, Covina; lower, Santa Monica Bay displays

Building Merchandise Peaks Where Valleys Were *Before*

By CLYDE H. POTTER
Commercial and Advertising Agent
Southern Counties Gas Company

THERE is no magic in merchandising modern gas appliances. Not a few words have been written about policies to be adopted or avoided, about certain selling plans to be followed and others which would be unprofitable, as well as a score of other problems of greater or lesser import to the gas company merchandise sales department.

But the solution of successful merchandising lies in this very simple formula:

A definite policy of selling appliances;

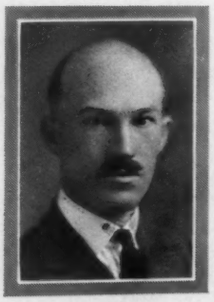
A stock of approved and recognized appliances;

Advertising support, both direct mail and newspaper display;

A well organized sales force;

A co-ordained effort from G.H.Q. down to the last outpost, where a girl in a distant office may be your only sales representative.

"The best schemes o' mice an' men, gang aft a-gley" unless they are carried out carefully by all departments of the utility. First a selling policy—then a recognized appliance—next a barrage of advertising to blast loose the prospects—an intelligent sales organization understanding your plan—and finally the tieing in of all forces. Without the full support and appreciation of the man who installs the appliances in the consumer's house, no sale may be considered closed, no campaign can be 100 per cent effective. Several of our sales were actually "killed" because the service crews failed to install appliances on the day marked on the sales contract. Such a happening is very disheartening to salesmen, the best of whom will lose the necessary "punch" if they feel that the service crews are not working with them. Therefore the wise salesman will always remember the men who set his appliances—a cigar now and then, a little help in offering to assist when the truck is being loaded with appliances—these seemingly unimportant acts pay big dividends to the salesman.



Clyde H. Potter

Hence, I repeat that there is no royal road to merchandising. There is one thing that will make your merchandise sales records outstanding. On the contrary the successful sales campaign depends upon a series of apparently lesser efforts, each of which may be the final factor in getting the signature on the contract. Tie together these ends, weave them into a strong selling chain. Then

when the prospect nibbles at any "bait" on the line, sales and more sales are certain to follow.

In our organization, the Southern Counties Gas Company, with 28 gas offices scattered throughout five Southern California counties from Santa Barbara on the north to Balboa Beach, Orange County, on the south, a serious merchandising problem one year ago confronted us. We found ourselves overstocked with 1268 gas ranges. Our stove sales were slowly moving at the rate of from 65 to 95 a month, leaving us with a stock sufficient to last fifteen months.

In the face of this, conditions apparently were none too favorable for increasing our monthly output. Building activity in Southern California had appreciably slackened and new consumers on our lines were comparatively few. We were "enjoying" our third consecutive dry winter which was reflected generally among the thousands of orange growers and farmers who would "put up with the old gas stove for another year or two."

Then we turned over a new leaf and began to merchandise.

George W. Smith, at that time general commercial agent for the company, made a careful analysis of the situation. It was decided to resort to direct mail advertising as the initial move of the campaign. Several thousand gas range broadsides were therefore mailed to a selected list of range prospects.

Now these several thousand folders did not do the magical thing for which we hoped—i.e., sell the 1268 ranges in a single month. But they did accomplish one definite object—they stimulated to a considerable degree the sales organization on our system and proved to the salesman that the company was willing to cooperate with him in a concrete way. Knowing that enthusiasm is half of the battle we at least started a ripple on the quiet merchandising waters.

About this time another step was taken by Mr. Smith which proved far-reaching in its selling effect. A small gas bill insert announcing a 15 per cent price reduction on our ranges was prepared and with the approval of O. R. C. Grow, district manager of our San Pedro territory, was sent to approximately 13,000 consumers throughout San Pedro and Wilmington.

The sales resulting from this inexpensive insert were tremendously gratifying. The gas ranges sold in Mr. Grow's district during the month of May with the 15 per cent bill insert developed prospects which totaled 58 as compared with an average of but eleven for the first four months of the year.

With San Pedro setting the pace five other districts on the system approved the "bill insert" sales plan. During the latter part of June the three districts of Santa Monica Bay, Pomona and Santa Barbara followed. The Whittier district put the plan into operation between July 15 and August 15 and the larger Orange County district between the latter date and September 15.

RANGE SALES MOUNT

Our gas range sales on the system during the month of May with one district experimenting with the new sales plan totaled 179, nearly double the sales of any previous month. Furthermore the momentum developed therefrom made June a very satisfactory month in sales, with 136 stoves sold.

But the month of July, with three large districts operating the 15 per cent sale plan, broke all previous records as well as exceeding our fondest expectations—334 ranges being disposed of by our now greatly enthused selling organization.

August stove sales amounted to 178, September 200, October 193, November 150 and December 251. During the first six months of the year with just the ordinary selling effort used our range sales totaled but 663. During the last half of the year, however, with real selling effort injected into the campaign, the sales were practically doubled—1306 stoves being sold during this later period.

By the first of August we had reduced our overstock of stoves to such an extent that our purchasing department found it necessary to order more stock. This has been done regularly since August, as we are now averaging our 200 ranges per month. We no longer have to worry about an overstock of models because our sales momentum carries on month after month, regardless of season.

Early last summer F. H. Bivens, our general agent, decided to inaugurate an intensive gas heater campaign starting about the middle of September. All plans were carefully laid in advance. Three pieces of direct-mail advertising were designed for distribution at different times during the fall.

The first piece of literature was a heater broadside in colors. Fifty thousand of these broadsides were mailed to our customers on September 16, all business districts, apartment house sections and certain other parts of our communities being eliminated.

On October 2 a second piece of literature, a follow-up sales letter, was mailed to the same group of consumers. The same number, 50,000 letters, were used in the second direct-mail barrage.

But this was not all!

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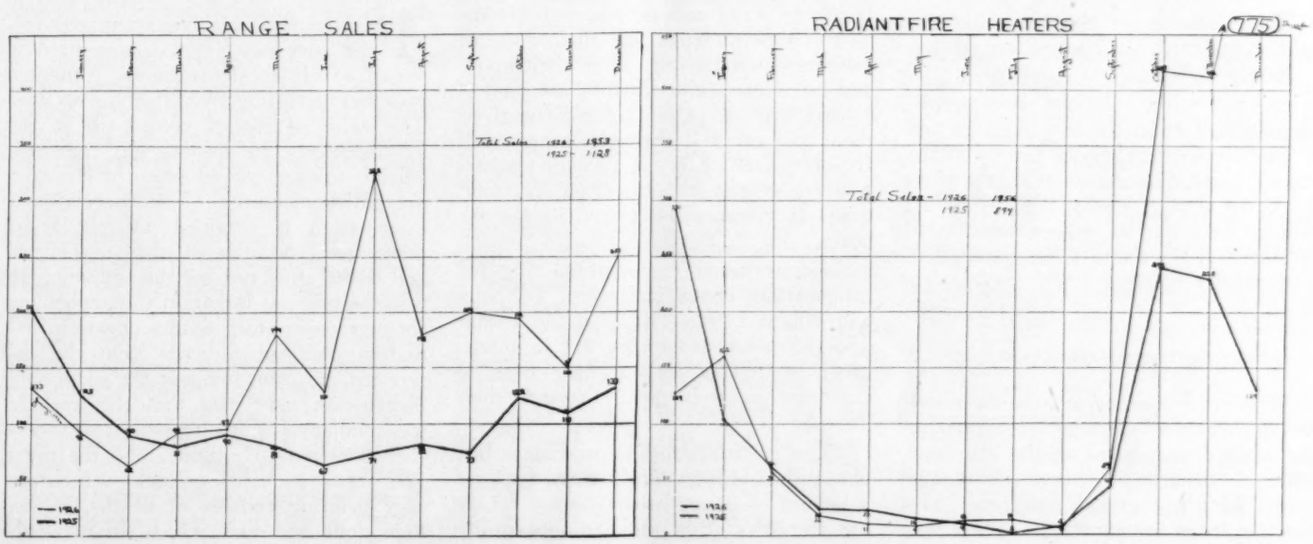

These graphs show what a strong merchandising policy has produced on the lines of the Southern Counties Gas Company. The heavy lines represent 1925 sales; the lighter lines, 1926 sales

PACIFIC COAST GAS ASSOCIATION

A Department Conducted by Clifford Johnstone, Executive Secretary

Regional Conference in Los Angeles

THE Southern Regional Conference of the Pacific Coast Gas Association will be held on Wednesday and Thursday, February 23 and 24, in the Chamber of Commerce Building, Los Angeles.

At 10:00 a. m., Wednesday there will be a meeting of the Association directors, in Room 10, on the 9th floor of the Chamber of Commerce building in which all sessions will be held.

GENERAL MEETING

Each section of the Association will contribute one feature to the success of the general session program. Those in charge of the program stress the fact that these features are all being so prepared as to be of general interest. Following is an outline of the general meeting program, which begins at 2:00 p. m. of February 23, in Rooms 1, 2, 3, and 4 of the 9th floor.

Accounting Section: T. H. Ross, vice-president of Eberle & Riggleman, Inc., public statisticians of Los Angeles, will speak on "The Use of Statistics in Business."

Commercial section: The subject of refrigeration will be discussed by Arthur L. Spring, Southern California District Manager, Servel Corporation, and also by Herbert C. Parker, general manager, Parker Ice Machine Company, San Bernardino, Calif.

The Commercial Section will also have a gas-fired refrigerator on exhibit.

Public Relations Section: A playlet bringing a public relations message will be presented from the Los Angeles Gas & Electric Corp. Service Group of the Pacific Coast Gas Association, the playlet being partly intended to stimulate interest in a playlet contest which will be staged at the Santa Cruz convention.

Technical Section: No information available as *Western Gas* goes to press.

DINNER WEDNESDAY EVENING

Wednesday evening at 6:30 there will be an informal get-together dinner in the main dining room on the 8th floor. Oscar L. Moore, in charge of arrangements for the regional conference, says that the ladies are expected. There will be entertainment features during the meal, and interspersed through the speaking program, including numbers by the Southern California Gas Company orchestra. A general dance will follow. Mr. Moore promises that the program will include a "minimum of talk and a maximum of enjoyment."

At 10:00 A. M. Thursday the section meetings will begin, comprising committee reports, discussion of the sections' programs of work and special features arranged by section chairmen. The meetings will be carried into the afternoon if necessary. The following information on meeting places will be found useful:

Accounting Section (E. N. Simmons, chairman): 9th floor, Room 10.

Commercial Section (C. M. Grow, chairman): 8th floor, Parlor D.

Public Relations Section (D. L. Scott, chairman): 9th floor, Room 6.

Technical Section (R. M. McCaliey, chairman): 8th floor, south end of dining room.

The same rooms will be used in case sessions are continued in the afternoon.

Secretary's Soliloquy

ONE of the most interesting things about being Secretary of the Pacific Coast Gas Association lies in watching the different ways men make use of their membership and the varying values they place upon it. And this applies to companies, too.

Some are always in the forefront, offering to write papers, asking for committee appointments, on their toes at meetings contributing what they know and learning all the other fellow knows. Others will accept any assignment given them and carry it through; others will accept and not carry it through; others will refuse, and still others (a very few, thank Heaven) will not even answer the letter.

Some write in frequently asking for information, books, pamphlets, statistics and whatnot; some drop in for a chat and the news when they are in town; others we never see nor hear from as the years go by except as they pay their dues.

In other words the Association is just about like life in general. Some men get a lot out of it and others do not. Like life, the Association offers an opportunity for which we pay a price and from which we reap as we sow and cultivate.

The reason for all this is that I've just been looking over the membership account book and I'm thinking with my pencil. Each year a number of men forfeit their Association membership for the sake of five dollars saved in dues. They don't resign, they don't explain, they just sink out of sight by default. We can only assume that they feel their membership is not worth the price. Perhaps it isn't, but then again perhaps the reason is that they do not use it rightly.

To those whose dues for this year are not yet paid, we can only say that the day of judgment is April first. After that, no dues—no membership.

Statistics for 1926

Returns from twenty-three representative gas companies serving manufactured gas on the Pacific Coast indicate an increase in gas sales of 3.3 per cent in 1926 over 1925. The number of active meters increased 6.2 per cent and the gross revenue received for the service rendered decreased 0.9 per cent. Sales per meter continue to decrease slowly, the percentage decrease this year being 2.2 per cent. It is to be regretted that the statistical returns made to the Association are so incomplete that no effort can be made to analyse these statistics.

Record of 1926 Accidents to Public from Use of Gas

THE Association has attempted for the past two years to maintain a record of all accidents to gas company customers resulting from their use of gas. The value of such a record lies in its intelligent use in guiding gas company officials toward the adoption of effective preventive measures. The Association's information is obtained entirely from newspaper accounts of these accidents and is therefore not entirely reliable. It was the original intention to supplement the newspaper story with accurate information obtained directly from the interested gas company, but the surprising obstruction developed that the average gas company is not interested and therefore does not investigate. So the press goes on in its happy-go-lucky inaccurate way printing records of deaths, burns, explosions and fires which do incalculable harm to our public relations and sales. Here is the record for 1926. In

addition to the so-called accidents listed, there were 146 proved suicides and 65 attempts at suicide.

ACCIDENTS, 1926

Asphyxiation, due to		
Leaks	3	
Hose disconnected or leaky	5	
Products of combustion	17	
Open jets or raw gas from burners	22	
Sub-total		47
Partial Asphyxiation, due to		
Leaks	8	
Hose disconnected or leaky	1	
Products of combustion	22	
Open jets or raw gas from burners	25	
Sub-total		56
Explosions, due to		
Leaks, fatal	4	
Leaks, not fatal	10	
Leaks, looking for leak with match	4	
Careless lighting, fatal	2	
Careless lighting, not fatal	39	
Faulty appliance	2	
Miscellaneous	6	
Sub-total		67
Fires, due to		
Overheating of woodwork	16	
Ignited leaks	2	
Ignited leaks from tubing	2	
Clothing in flame, fatal	15	
Clothing in flame, not fatal	7	
Gasoline near open flame (2 fatal)	5	
Miscellaneous burns, etc.	10	
Sub-total		57
GRAND TOTAL		227

Association Committee Set-up *for* 1927

THE committee programs as arranged by Section Chairmen and sent out to all members of the Association in October, together with a call for volunteers, have been rearranged in the light of the interest shown in the various topics and committees appointed. The personnel of committees as given below is taken from information available to the Secretary on January 17. There may be some additions. The organization of the Public Relations Section had not been entirely completed on that date, but it will be reported in full in the March issue of *Western Gas*.

In the Technical Section there are a number of topics of interest to gas plant operators which did not seem to warrant the appointment of committees but which nevertheless should receive some consideration at the Convention. These therefore will be thrown into a symposium on operation and time will be afforded for a general discussion. Mr. Frank Wills will have charge of the organization of the Symposium. A list of the subjects and those who will be especially invited to participate is given. Other subjects may however be added before Convention time.

ACCOUNTING SECTION COMMITTEES

E. N. Simmons, Chairman Accounting Section, Los Angeles Gas & Electric Corp.

Customers Accounting

O. L. Moore, Los Angeles Gas & Electric Corp., —Chairman.

F. C. Ingram, Southern California Gas Co., Los Angeles
W. M. Evans, Pacific Gas & Electric Co., San Francisco
C. R. Johnson, Portland Gas & Coke Co., Portland
J. E. Mannheim, Portland Gas & Coke Company, Portland
W. J. McCoy, Southern Counties Gas Co., Los Angeles
J. A. Cannon, San Diego Cons. Gas & Electric Co., San Diego

Pay Roll Procedure

B. H. Parkinson, Portland Gas & Coke Company—Chairman
Ben H. Hoke, Spokane Gas & Fuel Co., Spokane
W. Ingram Parke, Southern California Gas Co., Los Angeles
D. G. Martin, Pacific Gas & Electric Co., San Francisco
N. H. Bradshaw, Los Angeles Gas & Electric Corp., Los Angeles
C. A. Isbell, Southern Counties Gas Co., Los Angeles.
S. A. Mendum, Public Service Co. of Colorado, Denver
L. J. Thompson, San Diego Cons. Gas & Elect. Co., San Diego
Donald J. Graham, Puget Sound Power & Light Co., Bellingham, Wash.
O. R. Marvel, Los Angeles Gas & Elect. Corp.

Materials and Supplies

Norman R. McKee, Southern Counties Gas Co., Los Angeles—Chairman
A. H. Charonnat, Pacific Gas & Electric Co., San Francisco
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D. G. Martin of the Pacific Gas & Electric Co., San Francisco, will write a paper on Use of Tabulating Machinery and other Mechanical Equipment in offices.

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(Continued on Page 44)

EDITORIAL

A Challenge to the Sales Department

AS THE new year speeds on and we carry past the season when house heating and heating appliances occupy the center of the stage there comes a challenge to the sales department of the gas company. The challenge is new, and it comes to the commercial man in particular because gas science has already made a beginning in the field to which we refer—the field of new applications for gas.

Gas has won laurels in industry, and more are to be won. But those who have not lost all sense of proportion know that the backbone of the gas industry will always be the domestic load—and therefore a new domestic application of gas, such as refrigeration, is viewed as a call to action by the executive who has the future of the industry at heart. Through sale of such new types of appliances will come increased sendouts without proportionate investment in new mains and services. More appliances to the consumer means bringing many users out of the red into the profit column on the company ledger.

A 1927 challenge to the commercial department, then, is to work refrigeration by gas into its sales plans. Not half-heartedly, or single handed, but energetically, and cooperatively. This is a cause which can be made to produce wonders. Refrigeration by heat! The simple fact of gas refrigeration is a paradox to the layman. It holds all the possibilities of the miracle, if it is exploited rightly.

Sell refrigeration to add load-building appliances. Sell gas refrigeration to build up the summer valley. But sell gas refrigeration, too, to add the element of romance to our product which has too long been missing.

And sell it with every means at the commercial man's disposal. This cause will not be won in a day, or without consistent plugging. Even though deliveries may be delayed, and limited in number when they come, it is not too early to organize the program. Salesmen must learn gas refrigeration backwards and forwards, surveys must reveal the field of prospects. Company advertising must integrate with sales plans and tell the refrigeration story effectively, through old avenues and new.

This is a cause for the whole industry. Refrigeration is a highly competitive field, and every gas refrigeration unit which is installed precludes an electric sale.

Developments In Western Gas Manufacture

IN our issue of August, 1926, *Western Gas* was privileged to publish the first report released on an extensive investigation of fuels available for gas-making in the West. This report, presented under the head, "Study of Fuel Problems in Western Gas-Making," was a summary prepared by Wm. W. Odell, fuel engineer of the United States Bureau of Mines, who conducted the work of investigation in cooperation with the California Gas Research Council.

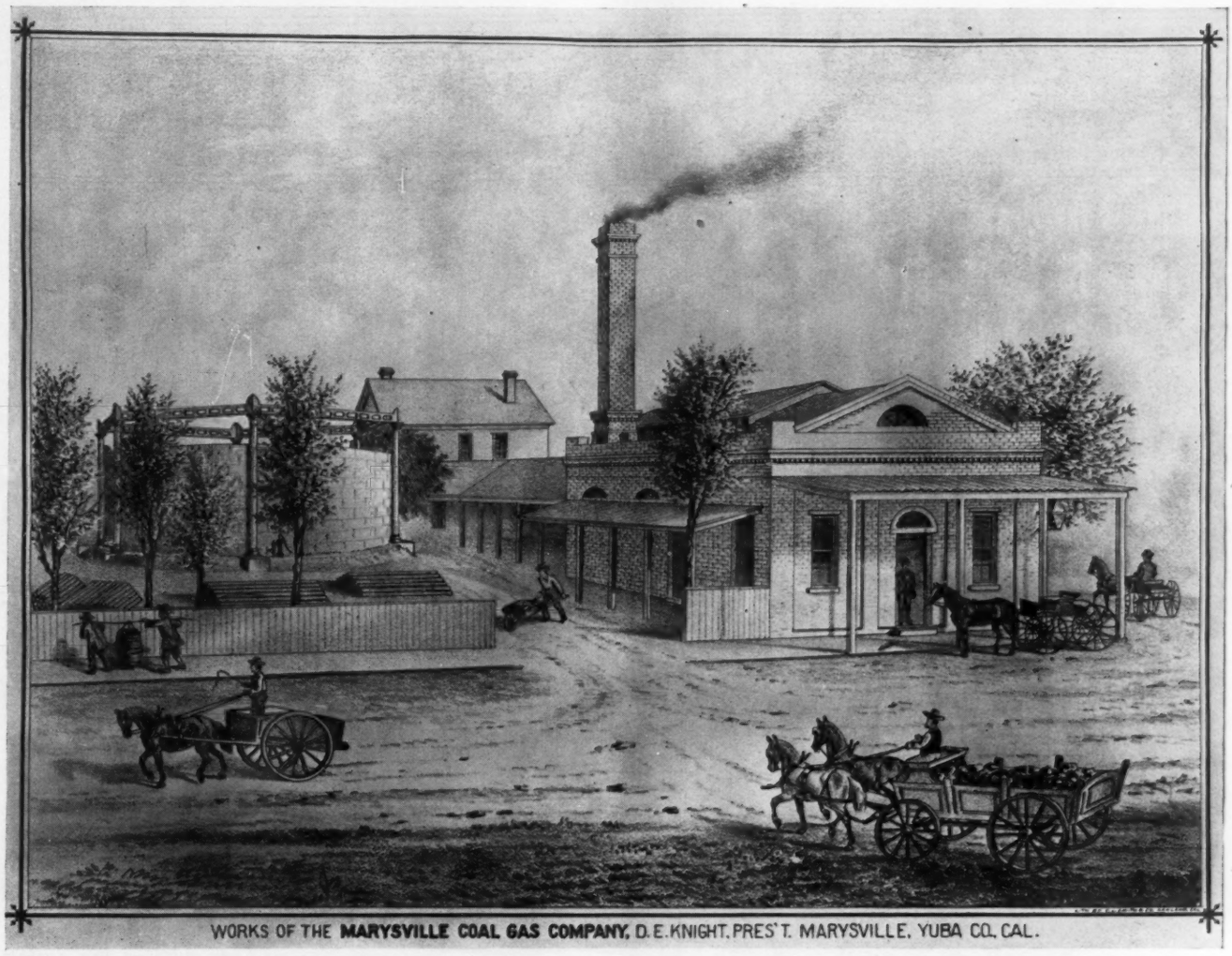
This outstandingly important research task was begun as a result of interest shown in the Western fuels problem by W. S. Yard and other Pacific Gas and Electric Company executives. The Marysville, Calif., gas plant of the Pacific Gas and Electric Company, now producing carburetted water gas, and using Western coals as fuel, is a practical application of the results of the research project referred to. Operating conditions at the Marysville plant are described in some detail in this issue by Frank Wills, gas production engineer of the Pacific Gas and Electric Company.

"Western Gas" As a Sales Help

IN selling gas for industrial, as well as domestic uses, sales literature is often useful. Some times the printed word will put the message across in a way that an interview cannot, for it permits of more leisurely consideraion of subject matter, and also can often obtain an "audience" which would not be accorded to a salesman.

Recognizing these facts, the Southern California Gas Company's new business department recently decided to put *Western Gas* to work in a new way. An extensive poultry colony was being added to the company's lines, and the problem was to introduce gas to the poultrymen. *Western Gas* for January, 1927, contained a well-written article on the use of gas in commercial hatcheries, and copies of this issue were presented to the prospective consumers by the company.

This practice might well be adopted by other utilities who are telling the industrial story of gas. Sales departments everywhere benefit by learning of successful applications of gas in industry which other companies have made.



1. In 1865 the brick building shown above was erected at Marysville to house the gas company offices. It still stands.

The New Water Gas Plant *at* Marysville, Calif.

By FRANK WILLS
Gas Production Engineer
Pacific Gas and Electric Company

¶ In his present article Mr. Wills gives *"Western Gas"* readers the first detailed description of operating conditions at Marysville, Calif., where the Pacific Gas and Electric Company has turned from oil gas manufacture to produce carburetted water gas, using Western coal as fuel.

¶ Back of this significant development in Western gas-making practice lies a long course of investigation of Western fuels, in which the United States Bureau of Mines and the California Gas Research Council co-operated with the Pacific Gas and Electric Company. The Marysville plant is a concrete application of the findings of this project.

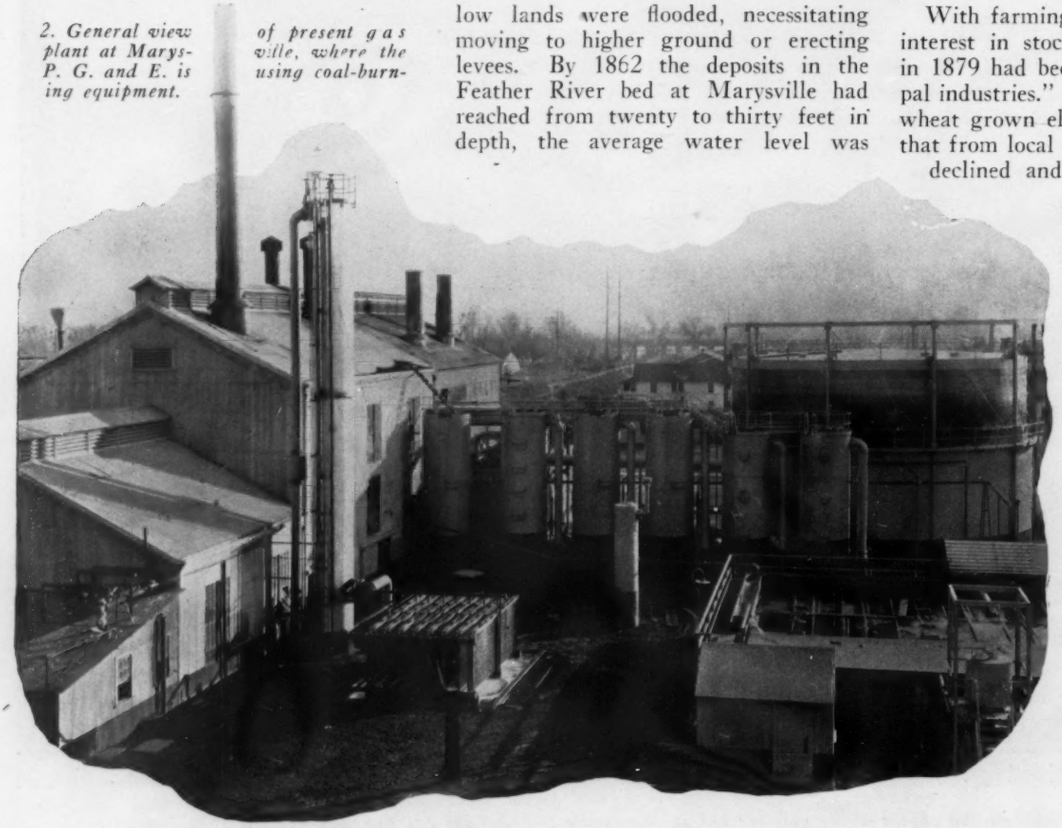
Frank Wills

IT is fitting that Marysville has been chosen as the place where the gas industry of California has made the first step to adopt modern coal-using equipment to supplant oil for the manufacture of gas. This community has witnessed many changes in its economic life. It has always pioneered in each change and has invariably reached prominence in each activity as one extreme succeeded another. Historically this city and its gas industry have many parallels.

The discovery of gold transformed a peaceful valley of scattered grain and stock ranches into a variety of activities to feed, clothe, shelter and amuse a multitude of fortune-hunters and to supply the tools and machinery for their mining operations. Where two adobe structures stood on the banks of the Feather River near the mouth of the Yuba, there was built and incorporated a city within only fifteen months (November 1849-February 1851). The rush was so great that the total population in California increased four-fold in one year (1850) and in a short time Marysville became the largest city of the State, eclipsing even San Francisco.

Transportation under such conditions was the greatest single problem. Marysville became the metropolis because it was at the head of navigation for river steamers and near the foot-hills which the miners were determined to raze. In a short time stage lines and pack trains were organized and at one time it is said that 10,000 pack mules were used to carry supplies to the mining districts. Soon thereafter a railroad was built, with Marysville as the terminus, and was later extended to Oroville.

To meet the needs of such a community many manufacturers erected estab-



2. General view of present gas plant at Marysville, where the P. G. and E. is using coal-burning equipment.

lishments and prospered. Among these were the following with the approximate dates of their introduction: Wagons, 1849; Saddlery, 1850; Canvas Partitions and Bags, 1852; Beer, 1852; Boots and Shoes; Brick, 1852; Foundry and Machine Shops, 1852; Leather, (Tannery), 1852; Lumber (Saw-Mills) 1852; Flour, 1853; Sash, Doors and Blinds, 1854; Brooms, 1855; Wine and Brandy, 1855; Soap, 1858; and, Gas, 1858.

During this time agricultural products were slowly reclaiming the ranchers' attention. The first wheat crop was gathered in 1845, but in 1848, at the call for the race to the foot-hills, the ranchers hurried away leaving crops standing in the field. Only one in the entire community remained behind to harvest his crop. Naturally the demand for grain, hay and produce was very soon quite heavy and slowly the less hardy and perhaps less fortunate ones turned to farming. They had many obstacles to overcome. The debris from placer mining gradually built up deposits in the river bed, raising the water level so that low lands were flooded, necessitating moving to higher ground or erecting levees. By 1862 the deposits in the Feather River bed at Marysville had reached from twenty to thirty feet in depth, the average water level was raised eleven feet and navigation was impaired. The floods of 1861-1862 had washed the mud over the fields at places as far as one and a half miles from the river and to a depth of five to ten feet on the bottom lands.

Nevertheless the production of wheat in 1861 exceeded the local demand and one adventurous soul shipped a cargo to Liverpool. It arrived safely and in good condition. This was a revelation because it had been predicted the changes in temperature on this long journey would cause the grain in the hold to "sweat" and be ruined. The news of this initial success spread rapidly. A drying process was introduced which gave further confidence in exporting, and then, agriculture became the object of the feverish desires of the population as mining did in former days; all the State went into farming as fast as land could be located and titles cleared.

Marysville became an important wheat and flour center, shipping to many parts of the world, whereas but a few years previous it had imported flour from Chile, Australia and Virginia.

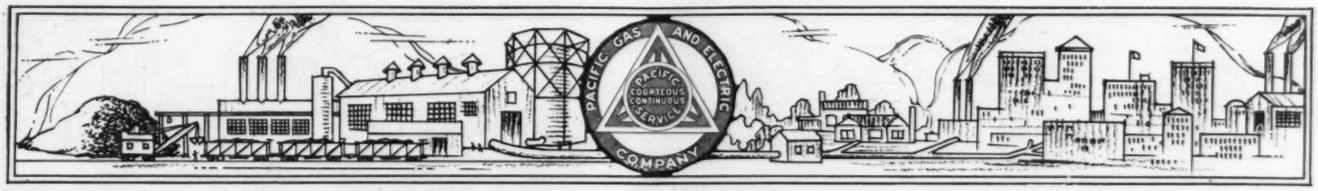
With farming, there came a renewed interest in stock, so that stock raising in 1879 had become "one of the principal industries." Later it was found that wheat grown elsewhere was superior to that from local fields; then this industry declined and the ever-ready "ace in the hole" came in handy. A small peach orchard planted from seed in 1846 and brought to bear in 1855 had been successful. Others followed in a small way and as wheat relinquished the lead this industry came forward until now these wonderful orchards supply three-fifths of the world's canned peaches.

At least three complete and successful transformations have occurred in this community. This is a great record for a city having just passed its seventy-fifth anniversary, and it is quite proper during this year, amid such historic environment and among these pioneering people, that the Gas Company should adopt a new process.

The gas industry in Marysville has experienced very similar see-saw workings of fate. At first gas was made from coal, then for a short period carburetted water gas was supplied, but with the development of the oil fields in Southern California the oil gas process was invented and now the carburetted water gas process adapted to the use of coal has been introduced there. Originally city gas was used for lighting. Electricity has chased it out of this field into a better one where any process requiring clean heat is its forte.

The first gas plant and building was erected on Virgin Alley in 1858. Coal gas was supplied, using iron retorts. In 1861 a set of clay retorts was installed and in 1865 a new plant with a substantial brick building and office was completed on the corner of Second and "B" Streets. This building still stands and is often, but erroneously, pointed out as the first building. *(Plate 1).*

Gas manufacture in those days was



just as full of trying conditions as with the more complicated processes today. The log of operation from 1861 to 1866 relates a few of the more serious mishaps. September 8, 1861—"Cannel Coal all out," and this was probably a critical time as on the next day the "County Fair Commenced." October 23, 1861—"Trouble with Purifiers—Lost the whole gasometer full of gas—trouble for two days." December 9, 1861 at the time of a great flood—"Height of water one foot over the level of the yard—made no gas for sixteen hours." January 10, 1862—"Height of water so it overflows our center valve and we had to pump for fourteen hours to keep from putting fires out. Water 5⅜ inches higher than on December 9, 1861." October 26, 1864—"9 P. M. Gasometer caught fast and remained; hung until 11:30 P. M.; Shut off gas to raise it."

4. A close-up of coal unloading equipment. Note size of coal.

Coal was imported and although it often came in as ballast, the high local freight rates made it expensive. It was bought through sundry dealers in rather small lots and the prices with each lot varied somewhat but were about as follows: Vancouver $13.50; Sydney $15.00; Chile $15.00; Cannel Coal from different parts of England, $18.60 to $22.80; Lesmahago, $23.80; Bog-head, $25.60; Wigand Cannel, $17.00 to $24.00. Several kinds were kept on hand and used in mixtures, as it was necessary to carbonize a lower grade with a better and more costly coal. Some of the mixtures were as follows:

2 parts Cannel
1 part Sydney—light not good.

6 parts Cannel
6 parts Sydney
1 part Lesmahago—lights fair.

Cannel coal with small quantity of wood.

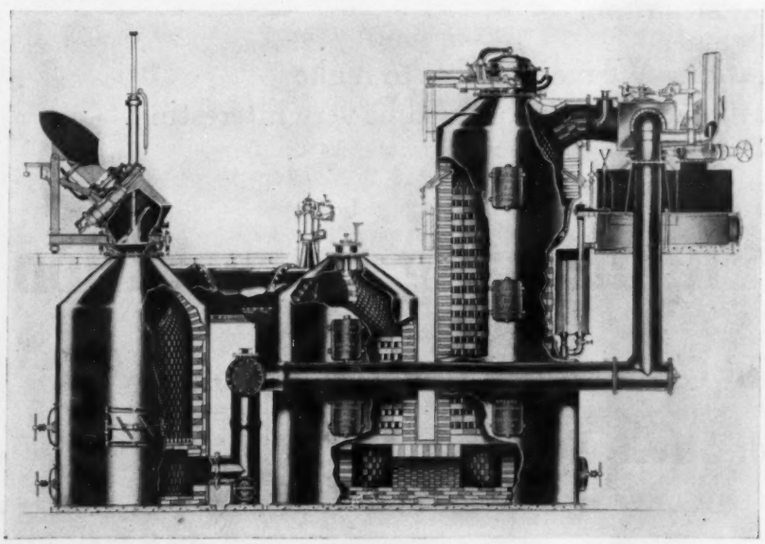
1814 pounds of Sydney
226 pounds of Bog-Head—quality of gas good.

1816 pounds of Walsend's Sydney.
113 pounds of Bog-Head—yield over 4 cu. ft. of gas per pound and quality of gas good.

In one case, the quality of Cannel purchased was very poor. A one-half mixture with Sydney yielded only two and three-quarters cubic feet per pound and the coke was very poor. One notation shows that two barrels of rosin were used in one week, during July 1861 and another, that three-quarters of a cord of pitch pine was used during April 1866.

The gas yields were up and down. This probably was due to the necessity of changing the mixtures to suit the kinds of coal on hand and also the varying quality of each kind. The average yield for the year ending July 6, 1864, was 3.5 cu. ft. of gas per pound of coal, whereas, the following year the average was 4.16 cu. ft. per pound. This latter figure includes about four months operation in the new plant which was started April 8, 1865.

The purification was accomplished by passing the gas through a layer of lime resting on a perforated plate. The lime cost $25 per ton and about one hundred pounds per thousand cubic feet of gas was required, making the cost of ma-



3. Steere Water Gas Set, showing automatic charger and back run line.

Two 9-ft. Steere Water Gas Machines

operating at Marysville, California, are an illustration of how manufacturing processes can be profitably adapted to changing economic conditions.

All problems cannot be solved in exactly the same way—but there is a right solution to every problem.

The combined facilities of the Steere Engineering Company and the Semet-Solvay Company are now available for the solution of any manufactured gas problem—great or small.

Steere Water Gas equipment
Semet-Solvay Gas and Coke Ovens
Condensing and Purifying equipment
Complete Aqua-ammonia plants
Ammonium Sulphate plants
Benzol and light oil equipment
Piping and valves—of every size.

Even though you contemplate no immediate change in your present equipment, we will appreciate an opportunity of studying your entire gas situation.

You incur no obligation. We may be able to make suggestions for your future expansion that will be very interesting.

Semet-Solvay Engineering Corporation

Division of Allied Chemical and Dye Corporation

40 Rector Street, New York, N. Y.

ANNOUNCING
THE FORMATION OF A
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FOR COMPLETE SERVICE TO THE
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A consolidation
of the Engineering Department of

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Original Builder
of By-Product Coke Ovens in America and

STEERE ENGINEERING COMPANY

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Designer and Builder of
Modern Gas Plants and Equipment.

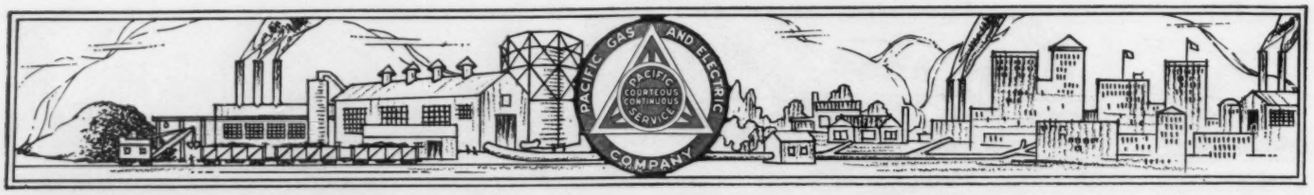
Over a period of several years, improvements have been made by the Semet-Solvay Company in the design of coke ovens and auxiliary apparatus, resulting in operating efficiencies not before obtained.

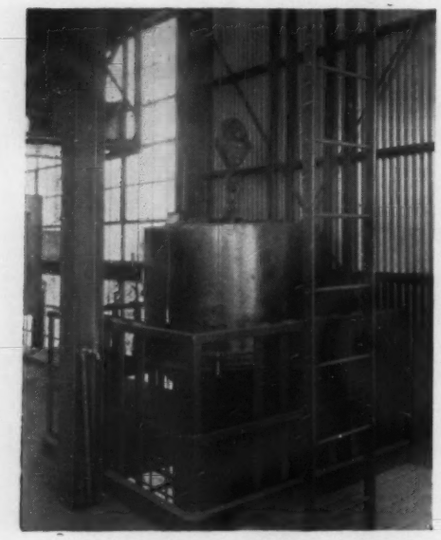
To fill the need for such service in this field, the improvements in design and operating practices, combined with the experience, facilities and personnel of the two organizations, are now made available for the coke and gas industries.

SEMET-SOLVAY ENGINEERING CORPORATION

40 RECTOR STREET · NEW YORK CITY

DIVISION OF ALLIED CHEMICAL AND DYE CORPORATION





5. Hoisting coal hopper into position.

terials for purification amount to $1.25 per M. The labor for handling the lime into and out of the boxes and the disposal of the foul-smelling spent lime must have added several cents per M. to the purification expenses.

EARLY GAS RATES

The price charged for the gas was first $12.00 per M. but was reduced to $11.00 in 1861 and $10.00 in 1863. For the year ending July 6, 1864 the lime used was 103 pounds per M., the gas yield 7,000 cu. ft. per ton, at an average cost of $16.40 per ton, the "leakage and condensation" loss was 20 per cent and the average daily make about 12,300 cu. ft. There were probably three men employed at the plant at that time as two benches were not operated until December 24, 1865. Records do not show the sale of any coke. It is possible that all of the coke was used for firing the benches, which were of the direct fire type.

The consumption of gas gradually increased from 12,300 cu. ft. per day in 1865 to 34,000 cu. ft. per day in 1879. From 1886 to 1896 there was a struggle against electric competition but at the latter date the use of gas as a fuel was beginning and although gas lighting declined the new uses inspired the industry to more rapid growth. In 1898 a rival company was formed and installed a 60,000 cu. ft. per day water gas generator upon a portion of the property at the present gas plant site. The coal gas company was purchased within a few months and within three years the water gas plant was superseded by a 90,000 cu. ft. per day Lowe crude oil set and in five years a 175,000 cu. ft. per day Jones set was added. These machines carried the load until 1924 when a 550,000 cu. ft. per day straight shot oil gas generator was built and the plant completely remodeled with provisions for future extension at a minimum expense. Then expansion became necessary almost immediately, due to the decision to run a transmission line to Oroville in lieu of rebuilding that plant.

PRESENT ADDITIONS TO PLANT

The present additional installations consist of two 9-foot Steere Engineering Company generators complete with back-run connections, automatic charger, auxiliaries, washer-cooler, cooling coils, tar extractor, multiple washer and tar de-emulsifier. The lampblack separators were converted into a tar separator and tar storage pit. *Plate 2* shows a general view of the plant. The row of six scrubbers extending out from the building was used with the oil gas sets. The oil gas formerly passed through these before entering the relief holder. Now, the water gas passes directly to the relief holder and then to the tall washer-cooler shown near the building. This one scrubber is all that is required. The scrubbing water is kept in a closed system passing first down through the tower, cooling the gas from 140 degrees to 68°F. thence through the cooling coils where it is chilled by water flowing over the outside. The cooling water on the outside of the coils is also in a closed circuit consisting of a cooling tower and the coils.

After leaving the washer-cooler the gas travels through the following apparatus in succession: exhausters, tar-extractor, multiple washer, purifiers, meter, storage holder, and compressors or boosters to the high or low pressure mains. The condensation and tar is collected in the tar separator from which the tar is taken to the de-emulsifier and thence to the tar storage. The condensation is used as process water for generating steam in the super-heater during the back-run. The flow sheet of the gas and by-products in this plant is much simpler than for oil gas and there is practically no waste water discharge.

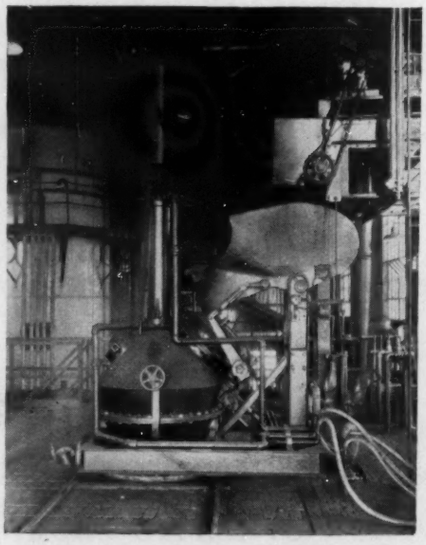
Plate 3 shows in detail the three shells, generator, carburettor and superheater of the Steere Water-Gas Set, designed for the use of coal as fuel, including the back-run connections and the automatic charger. Each set has a capacity of 80,000 cu. ft. per hour. This is in excess of the present requirements but allowance is made for further extension of transmission lines and probability of using certain low grade California coals which may reduce the capacity. The fuel used is pea-coal, three-quarter inch by one and five-eights inches (¾″x1⅝″) from Carbon County, Utah. It costs $7.50 per ton f.o.b. Marysville, the freight rate being $5.15. This coal in larger sizes costs $9.00 f.o.b. Marysville, taking a higher freight classification, $5.00 per ton. Its approximate analysis is as follows:

Moisture	2.0 %
Volatile	44.10
Fixed Carbon	47.80
Ash	6.10
B.t.u.	12,960
Sulphur	0.521

Diesel oil costing fifteen cents per barrel above that of fuel oil is used for enriching. Its specifications are as follows:

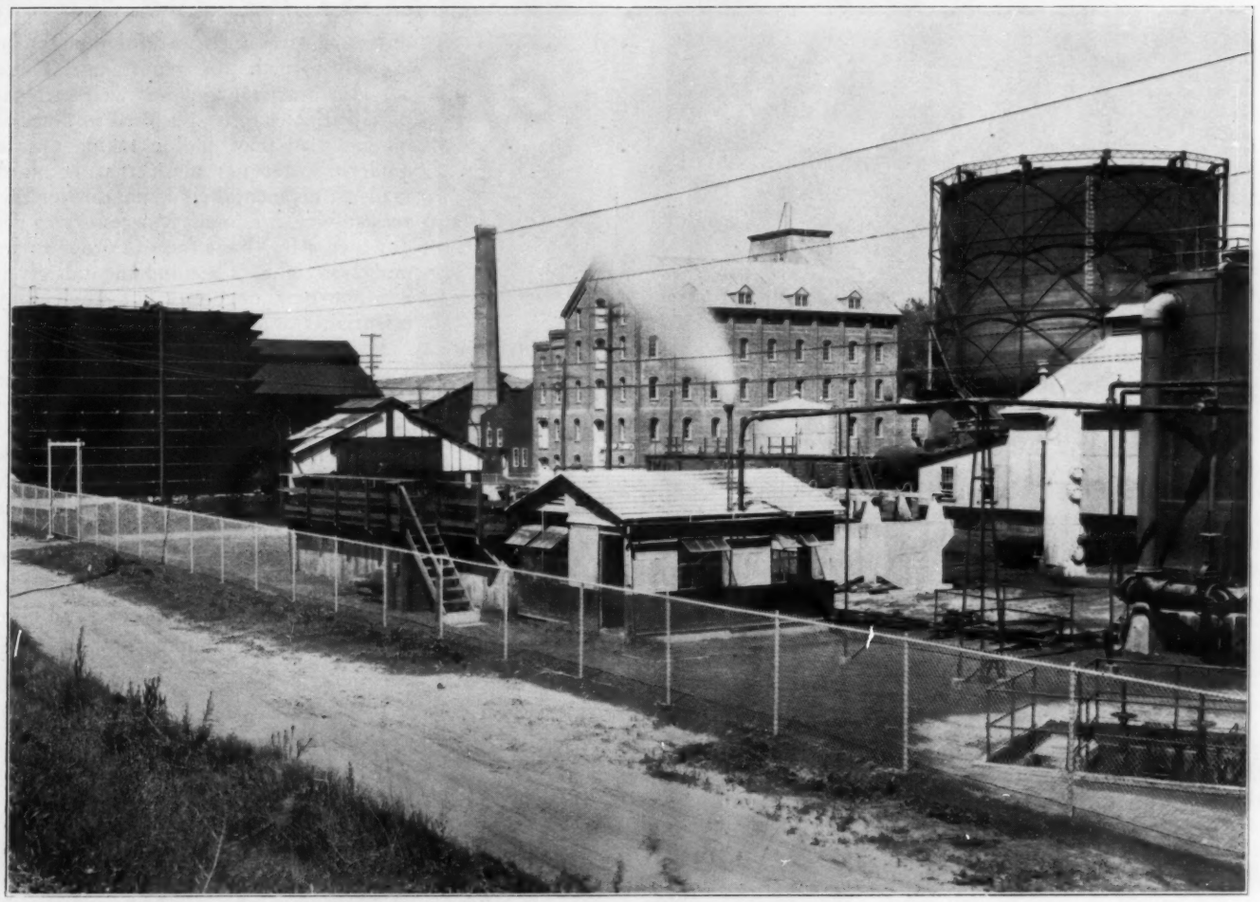
Be. at 60° F.	28.0 to 32.0
Sulphur	.50
Viscosity at 200° F.	30
B.t.u. per lb.	19,085
Distillation:	
200° C.	2.0%
250° C.	16.7
300° C.	39.0
350° C.	29.0
400° C.	8.3
404° C.	4.0
Residue and Loss	1.0

The selection of these materials and this process was made after a thorough study by a representative of the Bureau of



6. Automatic coal charging and spreading apparatus at Marysville plant.

BRAUN



Braun Apparatus in the new Marysville Gas Plant of the Pacific Gas and Electric Company includes a Braun Atmospheric Cooling Tower (at left of picture) and a battery of Braun Gas Coolers.

C. F. BRAUN & CO.
Manufacturing Mechanical Engineers
Alhambra, Calif.
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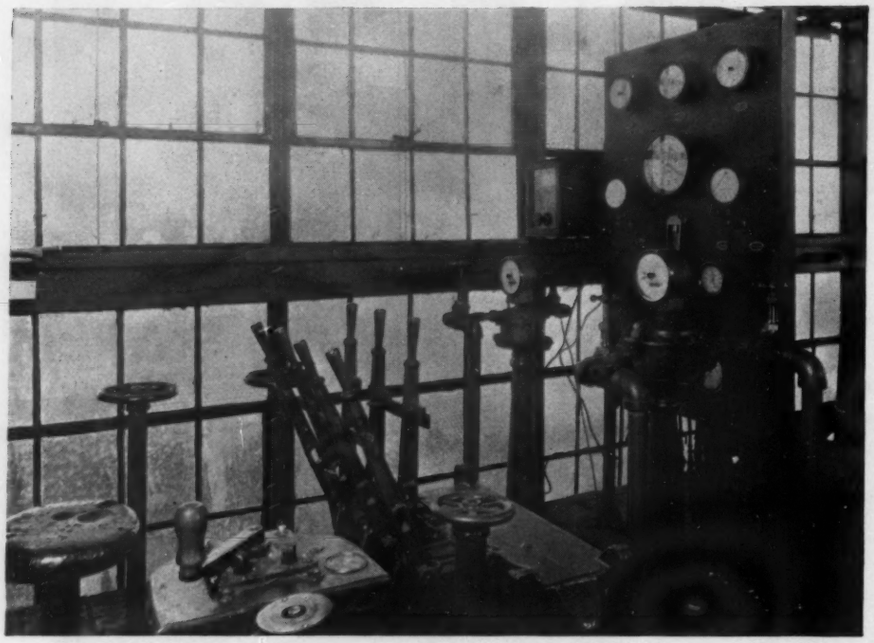


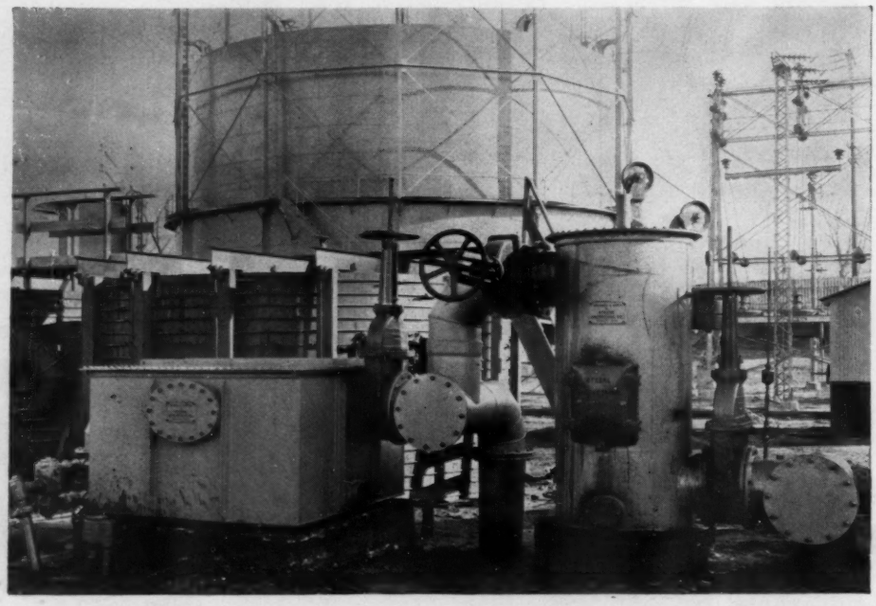
7. Operating controls, gauge board and meters.

Mines under the direction of the California Gas Research Council. The non-coking coal of Utah is very similar to certain eastern coals that have been found most suitable for use in water gas machines and the modern water-gas plant seemed to suit quite well the requirements imposed by California conditions. The final decision upon the process was rendered after comparing operating results of oil gas plants in California with carburetted water gas plants in the East using coal as fuel. For plants the size of that at Marysville it is found that as a rule the oil gas costs are higher. In case future oil prices increase the advantage will be still more in favor of carburetted water gas. It is also possible that some of the California coals may soon prove satisfactory for this purpose, thus making it still more attractive, and, furthermore, the investment for water gas for equal capacity for this size unit is less than for oil gas.

Inasmuch as this plant has operated only a short time, very little data have been obtained. The first problem has been one of plant organization and the training of operators in the mechanical details of the new equipment. Therefore, from a technical standpoint we can at this time discuss only a few fundamentals which we have found useful to a fair understanding of "what it is all about."

Although this process has been proven commercially, the details of operating procedure have not been as well standardized as the mechanical perfection of the equipment. The operating cycle is somewhat more complicated than that with the oil gas or the old water gas machines. The fact that during the making periods of the cycle all of the four known commercial gas-making reactions are employed makes this new set susceptible to alterations to take advantage of those most economical in each case. This feature, however, gives the operator a greater number of variables and unless he gives them careful thought he is likely to make many mistakes. There are also practical kinks as well as technical variables to be mastered so that the oil gas man may find in taking over a modern water gas plant that he must readjust his mental equipment. For this reason, we have found it necessary to get down to a few basic facts in order to set ourselves right. The fundamentals given are not new or novel but are simply essential.

The four reactions referred to are: Distillation of coal (coal-gas), the cracking of oil (oil-gas), the action of steam upon hot carbon (blue-gas) and the action of air upon hot carbon to produce carbon monoxide. A careful study of each of these shows distinctly that the problem in operation and design is to collect the greatest percentage of coal gas and recover the maximum amount of the sensible heat of the finished and blast gases, while maintaining proper condi-



8. Tax extractor and multiple washer installed in Marysville plant.

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tions for each in the set. The operator must have an appreciation of the individual parts of the process in order to find the intermediate running conditions which give the best efficiencies for the apparatus and the materials he is using.

Theoretically the decomposition and distillation of coal for gas is thermally quite efficient. Since there has been so much difficulty in determining whether or not it is endothermic or exothermic it is assumed that neither is the case. For the present purpose Professor Lewes' figures for external heat required, with this correction, will suffice:

Heat used in retort per pound of coal carbonized:

1.	Decomposition and Distillation	000 B.t.u.
2.	Escaping in gas and vapors as sensible heat	324 B.t.u.
3.	Sensible heat of hot coke	442 B.t.u.
	Total	766 B.t.u.

Disregarding the efficiency of the furnace that heats the retort or oven and any radiation or convection, considering that the necessary heat for this reaction be applied without loss, then 766 B.t.u. is necessary to carbonize a pound of coal, permitting the gas to escape at carbonizing temperatures and the coke withdrawn hot. This means that for a 12,500 B.t.u. coal about 6.1 per cent of its latent heat is required for carrying on reaction. If the sensible heat of the gas cannot be recovered, but that of the coke can, there will be required only 324 B.t.u. or 2.6 per cent.

In California, there is no market for coke in quantities, and any process using coal must be such as to consume the coke. The water gas machine operating on coal can utilize the sensible heat of the coke to advantage, but the difficulty is to recover the maximum portion of the coal gas liberated and to utilize its sensible heat.

It is reasonable to suppose that the distillation of the coal in the generator will continue at a fairly constant rate since the upper part of the generator will not change greatly in temperature during the cycle. Actual tests reported by Mr. Murdock (A. G. A. Carburetted Water Gas Committee, 1926) indicate that this is true. This is probably more nearly exact if the charges are frequent and light, thus applying the fresh coal almost continuously. Under these conditions the percentage of coal gas recovered in the finished gas is approximately in proportion to the time the stack valve is kept closed.

The coal gas given off during the up-run must pass over a considerable amount of checker surface in the carburettor and superheater and that during the down-run must travel through the hot zone of the generator. Evidently a certain amount of "reforming" of this coal gas takes place resulting in a "swell" of volume and reduction in

9. Tar de-emulsifying plant.

B.t.u.; thus, each pound of coal will, in this process, produce a greater volume of coal gas but of lower quality than in retorts or ovens.

In the manufacture of oil gas the cracking chamber is maintained in the neighborhood of 1800°F. and the gas leaves the off-take at about 1500°F. Each pound of oil produces from eleven to twelve cubic feet of from 850 down to 775 B.t.u. gas, .10 to .12 pound tar and .44 to .50 pound of carbon. The reaction is exothermic, producing about 513 B.t.u. per pound of oil, but the sensible heat of the gas and vapors and the heat of vaporization of the tar carry away 700 B.t.u. requiring that a net of 187 B.t.u. per pound of oil (about one per cent of its heating value) be supplied to carry on the gasification.

Complete data are not available for direct comparison of the behavior of the enriching oil in the carburettor and superheater. The carburettor temperature is about 1400°F. The gas leaves at some temperature below that so that its sensible heat is less and it is hardly necessary to go into thorough details for comparative purposes as it is known that 100,000 B.t.u. per gallon goes into gas with the formation of tar as a by-product, which is readily utilized, whereas, in oil gas generators 73,000 B.t.u. per gallon (for good oil) are accounted for in the gas, leaving lampblack and tar which are not readily handled. Certainly the actual difference in heat of reaction in the two cases cannot be sufficient to influence the advantage of using oil in carburetted water gas rather than in oil gas even at ten per cent advance in price, nor can it be great enough to cause serious error in any conclusions drawn here.

The blue-gas reaction occurs in both the water gas and the oil gas generators. In each case the amount of steam used in the generator per thousand is about the same. In oil gas with good conditions about 25 per cent of the steam reacts with the carbon, but in carburetted water gas 50 per cent of the steam enters the reaction. This shows a much better use of the steam in the latter and in addition there is a second advantage. The blue gas which is made in the generator at a temperature above 1800°F. and must leave the reacting zone at that temperature, gives up a portion of the sensible heat to the distillation zone and possibly some to the carburettor.

Assuming that a fair blue-gas analysis is CO_2—4.8 per cent, CO—42.8 per cent, H_2—52.4 per cent; the details of the reaction are approximately as follows:

Input per M. cu. ft. Blue Gas

15 lbs. carbon for making (latent heat at 14,544 B.t.u. per lb.)		218,150 B.t.u.
From boilers:		
25 lbs. steam for reaction	29,850	
25 lbs. steam for excess	29,850	
		59,700 B.t.u.
From generator blasting:		
Heat stored in carbon for reaction	31,750	
Heat stored in carbon to supply that carried away by the gases and excess steam	60,000	
		91,750 B.t.u.
Total		369,600 B.t.u.

Output per M. cu. ft. of Blue Gas

Latent heat of gas	309,600 B.t.u.
Sensible heat of gas	37,800 B.t.u.
Sensible heat of excess steam	22,200 B.t.u.
Total	369,600 B.t.u.

Of the heat input 16.2 per cent must be supplied from the boilers and 24.8 per cent by blasting the fuel bed; therefore, the efficiency of this reaction depends

largely upon the efficiency of the boilers and the blasting period. Of the heat in the output—16.2 per cent will be lost unless the sensible heat is utilized. Thus, the blue gas reaction is really a very large consumer of heat and ordinarily utilizes only 84 per cent of what it actually receives. It is economically possible only because the materials, carbon and water, are cheap.

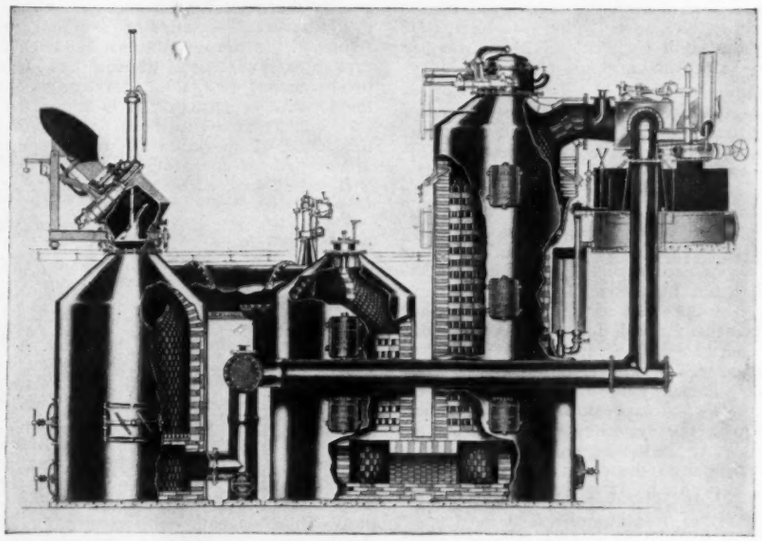
While each of the reactions may be followed individually and to considerable length, with profit, a grouping of certain figures from these three brings out the one most important problem in carburetted water gas manufacture when using coal as fuel. This problem is the maintenance of the proper distribution of heat to each of the three shells. In the following table there is summarized the approximate theoretical heat required in the generator and carburettor to satisfy the conditions for the generation of coal gas and blue-gas in the generator and enrichment with oil gas in the carburettor. This is based upon the gasification of one pound of coal and the approximate amount of oil which will be used with it, but does not include the coal and gas burned during the blast period.

Approximate Theoretical Heat Required per Pound of Coal Gasified During Make Period

Reaction	Coal and Oil Used	Estimated Gas Made Cu. Ft.	Boilers for Total Gas Making Steam B.t.u.		Generators B.t.u.	Carburettor Btu
Coal Gas	1 lb. coal	6.0		In Gas	324	
				In Coke	442	
				For		
Blue Gas	.478 Carbon	31.8	1902	Reaction	1012	
				In Gas	1912	
Oil Gas	⅛ Gal. or .92 lb. oil	8.3	----		----	172
Total		46.1	1902		3690	172

The purpose of presenting these figures is not to attempt a heat balance but to show briefly the general situation. The oil gas plant operator is so accustomed to handling the heating period as to carry the heat into the checkers, that he may find it difficult to readjust himself to the fact that it is in the generator where the greatest heat must be stored and even with very good conditions the tendency is to overheat the carburettor. It must be remembered that the oil gas operator stores heat in the checkers for both blue gas and oil gas reactions, whereas, in the water-gas sets, it is necessary to store heat in the checkers for only the oil gas reaction, which requires little heat.

(Continued on Page 36)



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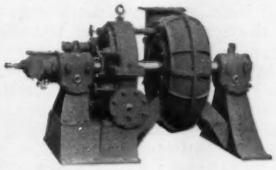

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If the carburettor is overheated the oil gas efficiency drops toward 70,000 B.t.u. per gallon instead of remaining up to or slightly over 100,000 B.t.u. per gallon, resulting in a low quality of gas or high oil consumption. At first it is advisable to watch this very closely and to do so one must not rely upon the pyrometer readings entirely. In addition, inspect the checkers at the sight cocks and make an occasional test by holding a paper in the stream of gas escaping from a sight cock on the superheater during the up-run. There should be no deposit of carbon; a smooth brown stain indicates good conditions while oily spots show low heat. Of course, the sight cock should be thoroughly cleaned before making this test.

The inventors of the back-run feature provided a means for assisting in the balance of these heat conditions. By connecting the bottom of the generator to a special three-way valve on the offtake of the superheater, they have made it possible to introduce the steam for the down-run into the superheater, causing it to take on superheat from the checkers. Thus, the "down-run" became really a run backward through the set without oil, hence its name. It lowers the temperature of the checkers slightly. A further improvement was made by generating this back-run steam in the superheater instead of the boiler. This is done by spraying water as a very fine mist into the top of the superheater. The temperature of the upper checkers in the superheater should not be lowered more than they will recover during the remainder of the cycle. This cannot be taken for granted. It must be watched.

When using coal as a generator fuel this feature is of special importance. As may be understood from the foregoing statements on coal gas there is a considerable amount of combustible gas carried out of the generator during the blasting period. When this is burned in the checkers by the secondary air there is a greater tendency to overheat them than would be the case with anthracite coal or coke fuel. Also, it is clear that this tendency increases or decreases with different coals as the ratio of volatile matter to the fixed carbon is greater or less. As a rule the low grade fuels have a high ratio; consequently, the use of such fuels has been made possible, but with each grade the optimum conditions must be determined by trial.

The "blow-run" is another means of assisting in maintaining a proper distribution of heat. For a short interval following the blast period the secondary air is shut off and the stack lid closed. This period utilizes the fourth gas-making reaction in that, the combustion of carbon in the generator is not complete, yielding carbon monoxide, carbon dioxide and nitrogen, and, since the distillation of the coal is constant, some coal gas is mixed with the products. The real purpose is to continue to store heat in the generator, without heating the checkers, and to recover the escaping combustibles. The high nitrogen content in this gas results in low heating value and high specific gravity. At best, this period can be used for only a very short time and, as yet, it has not been tried at Marysville.

In addition to the general principles which must be followed in maintaining proper heat distribution, there is a very practical matter that rules supreme. This is the clinkering. We have run the full range between the two extremes and it appears the solution lies in reducing the blast rates. It is desirable to have a short blowing period in order to keep the stack lid closed as great a percentage of the time as possible; however, the clinkering conditions must be satisfied; otherwise, the clinkers will be hard to break and difficult to remove; also it will probably be necessary to burn down the fire occasionally in order to knock off the side clinkers.

In the old water gas practice with coke fuel, it was considered that the coarser the fuel the higher rate of blast may be used. Apparently this holds true with coal. Since we are using a very small coal this should lead to a very low air rate and it finally has done that. At first, the air rate was as high as 250 cu. ft. per square foot of grate area per minute and it was necessary to burn down every few days. This is very uneconomical, as for good coal gas and blue gas production, the fire should be kept at full height all the time. At present, the blast rate is seventy-six cubic feet per square foot per minute. The clinkers are more easily removed. In the meantime it has been found that the ash content of the coal has increased to eleven per cent, thus practically doubling the amount of clinker. It is hoped that future improvements in the art will soon make this phase of operation less troublesome.

The present operating cycle is as follows:

Blow—1 min. 10 sec. at 76 cu. ft. per sq. ft. per. min.

Uprun—1 min. 40 sec.—1½ lbs. steam per sq. ft. per min.

Backrun—2 min.—1¼ lbs. steam per sq. ft. per min.

Steam Purge—5 sec.

Air Purge—5 sec.

The hourly make with this cycle is 70,000 cubic feet and the coal and oil consumption is 35 pounds of coal and 3 gallons of oil. The optimum cycle has not yet been determined. Further changes, one at a time, will be made. Since capacity is not important we have a good opportunity to make such changes. The coal and oil consumption is higher than would be secured if the generator could operate continuously and for a longer period each day. The sendout during the winter season varies from 500,000 cu. ft. to 750,000 cu. ft. per day and the holder capacity is only 200,000 cu. ft.

One of the most satisfactory auxiliaries of this machine is the automatic charger. Coal is added during the back-run so that no time is lost. The charges are well distributed and their weight and position may be regulated at will.

Although we do not feel that we have as yet obtained our best operation, we can at this time state that the adoption of this method of gas manufacture in Marysville has proven satisfactory. The production costs have been reduced. The additional load required to supply Oroville has not caused any increase in operating crew over and above that formerly required in the oil gas plant for the local sendout. The average heating value has been maintained as readily as with oil gas and the service to the consumer is on a par with that previously rendered. The consumers who have been questioned seem to think that if there is any difference in the gas, it is better now. The service complaints are normal. There have been no noticeable changes in pressure conditions and no unusual effort has been made to boost the pressure at the Works' outlet. The distribution system in Marysville is 95 per cent low pressure, while in Yuba City and the remaining territory, it is high pressure.

It may be of interest to note the change in character of the gas served and its effect upon appliances. The following are analyses of the gases before and after the change:

	Oil Gas	Carburetted Water Gas
CO_2	3.0%	8.0%
C_6H_6	1.2	1.6
CnH_{2n}	1.9	6.8
O_2	0.1	0.4
CO	10.8	18.2
H_2	57.1	36.8
CH_4	25.2	20.8
N_2	0.7	7.4
B.t.u.	551	558
Sp. Gr.	.389	.625

About twenty-five per cent of the appliances required adjustment with this change.

The transmission line to Oroville consists of twenty-six miles of eight-inch and six miles of six-inch pipe. There are 1,150 consumers in Oroville and about 1,500 new consumers will be secured en route. It is probable that within one or two years the transmission line will be extended by adding twenty miles of six-inch pipe from the far end of the present eight-inch section, to Chico, where 2,500 consumers are now being served by a local plant. At present an initial pressure of twenty pounds per square inch at the Marysville end has been sufficient for transmission and distribution and the loss in heating value between Marysville and Oroville is about five B.t.u.

Thus in production, transmission, distribution and utilization, the practical outcome of this adventure has proven successful. It is not necessary that the supply of fuel oil become depleted or that the price advance in order to make this change feasible, for it is paying its way in Marysville, now. Like Yuba County's wheat field of 1845 and peach orchard of 1855, it is another trump in the hand to be used when the occasion demands, whether it be five, ten or twenty years hence. At present, the work is education, standardization of operation, improvement in the method for removal of clinkers and further recovery of waste heat. This done, the application may be extended into larger plants immediately. These tasks are not difficult for such great advances have been made in all of them in the eastern States within the past few years that the oil-gas man of California need not worry about the future fuel oil supply.

SOUTHWESTERN TAKES OVER GAS SYSTEM IN BLAIR, OKLA.

On January 1 the Oklahoma community of Blair was added to the system of the Southwestern Gas & Electric Company, a gas franchise being granted to that utility in a municipal election.

CHICKASHA GAS & ELECTRIC CO. JOINS SOUTHWESTERN

With the election on January 10 of Earl Ernsberger, president of the Southwestern Light & Power Company, to the presidency of the Chickasha Gas & Electric Company the operation of the latter in conjunction with the Southwestern began. Miss L. D. Harris was elected Secretary-treasurer, and F. D. Shaffer was re-elected vice-president.

ERNSBERGER NAMED IN OKLAHOMA UTILITIES ASSN. POST

Filling the vacancy caused by the resignation of J. H. Buell, Earl R. Ernsberger was on January 8 elected to the vice-presidency of the Oklahoma Utilities Association at the quarterly meeting of that body held on January 8. Mr. Enrsberger, president and general manager of the Southwestern Light & Power Company, was also named a director of the association, which position was formerly held by Mr. Buell, who is vice-president of the Oklahoma Power Company.

CALIFORNIA UTILITY GROWTH SEEN IN COMMISSION RECORD

Records of the railroad commission of California show that that body in 1926 authorized the issue of $150,102,521.59 of stock, bonds, notes and other evidences of indebtedness. Of this figure $123,687,300 was the gas and electric utilities' share—which was in excess of $12,000,000 greater than the figure for 1925 for the same classes of utilities.

Natural Gas Service *Is* Begun *in* Los Angeles

COMMENCING January 25th, the Los Angeles Gas and Electric Corporation began the service of natural gas, superseding the 850 B.t.u. mixed gas which has been the standard of service since 1923. Two days later, January 27th, the Southern California Gas Company began similar service to all its customers not then supplied with natural gas. Mixed gas was first introduced in Los Angeles in 1915, shortly after the completion of the Midway pipe line from Taft. At that time, the mixture averaged 815 B.t.u., but with the decline in the natural gas supply in 1920, the standard was reduced to 750 B.t.u. Later, upon the development of large quantities of gas at Signal Hill and Santa Fe Springs in 1923, the Railroad Commission recommended an increase of mixed gas quality to 850 B.t.u., but without any corresponding increase of rates. Now comes the service of straight natural gas, which is an increase of more than 30 per cent in the B.t.u. value of the gas distributed for domestic and commercial purposes. However, for the service of the higher B.t.u. natural gas henceforth, the Commission has recognized that the rate should be increased in accordance with the increase of heating value of the gas.

With the start of this new service, many questions arise as to its effect upon the operation of various gas appliances. Most ranges which are now in use in this district are designed for properly burning the 850 B.t.u. mixed gas. In general, the use of natural gas of higher B.t.u. and higher specific gravity will not cause serious trouble. The adjustment to be made to accommodate this change will be merely the opening of the air shutters on mixing tubes, but in some cases the orifice must be reduced slightly in size. The pressure at which gas is distributed in this district ranges from seven to eight inches, and this is sufficient to assure the possibility of making a satisfactory adjustment. Radiant types of heaters will, in many cases, require adjustment to cut down the volume of gas consumed, as many of these heaters are used in living rooms and are not vented, and under such conditions particular care must, of course, be exercised to obtain complete combustion of the gas. The primary safeguard which should be carefully followed in operation of practically all types of unvented heaters is to avoid an excessive use of gas, and secondly, provide a reasonable amount of ventilation. The need of such precaution is repeatedly emphasized by the frequent reports of asphyxiation, which investigations show in nearly all cases are directly attributable to an excessive use of gas in poorly ventilated rooms.

With the change to natural gas service, there will also be a change in rate per thousand cubic feet, which will probably average between 91 and 92 cents per M.c.f., as compared with 69 cents per M.c.f. for 850-B.t.u. mixed gas. The rates have been designed by the Railroad Commission to retain the same charges as are now in effect for a given number of heat units, that is, with natural gas service, the consumer will receive approximately the same number of heat units per dollar as heretofore with the mixed gas. These new rates and the class of service are the result of the Railyroad Commission's decision of December 31, 1926.

In July, 1925, Los Angeles Gas and Electric Corporation, Southern California Gas Company, and Midway Gas Company applied to the Commission for increases of rates. Inasmuch as these applications were so interdependent, they were consolidated by the Commission for hearing and decision.

¶ **Gas men all over the West have been following the gas rate situation in Southern California with a good deal of interest. This report on the present status, which has brought the introduction of natural gas service, represents interviews with officials of the companies involved.**

Officials of the Los Angeles Gas and Electric Corporation stated that since 1920 that utility has failed to earn a fair return, the average earning being only about 6¼ per cent. This situation is directly attributable to the heavy increase in the unit investment per consumer. This investment has increased from $90 in 1920 to approximately $175 per consumer at the present time, due largely to increased construction cost during the post-war period. Also, with the increase of gas quality from 750 B.t.u. to 850 B.t.u., which was ordered by the Commission in 1923 without any corresponding increase of rates, the same company further failed to make proper earnings. This situation has resulted in an accumulated deficit to the Los Angeles Gas and Electric Corporation of approximately $1,350,000. Because of the apparently dwindling natural gas supply, it was obvious that the companies must seek relief through application to the Railroad Commission for higher rates. It was necessary that complete evidence be presented to first fix the wholesale charges for natural gas supplied by the Midway Gas Company before the retail domestic rates could be determined for the distributing utilities. The applications of the Los Angeles and Southern California Companies requested merely an increase of rates for the mixed gas service, not contemplating any change from that standard, as the natural gas supply did not then appear to permit the service of other than mixed gas, because of the very heavy winter loads. Early in the hearing of the case, it became evident that the City of Los Angeles, while not strenuously opposing the request for higher domestic rates, did urge the service of natural gas as supplied generally throughout the surrounding district. Much evidence was presented, showing the relation of the available natural gas supply and the corresponding requirements for domestic service. All of these studies showed that there will, without question, be periods during the winter seasons when the total natural gas supply must be augmented with oil gas to meet the demands of domestic consumers. This means the operation of the present gas plants to provide the necessary standby service at times of natural gas shortage.

This winter, Los Angeles has experienced some very heavy gas weather. On December 23rd, the Los Angeles Gas and Electric Corporation sent out 147,000,000 cu. ft., and the Southern California Gas Company's mixed gas load was sufficient to increase this figure to nearly 200,000,000 cu. ft. while the domestic natural gas send out of the Southern California Gas Company increased the grand total to 229,000,000 cu. ft. This amount of gas is greater in volume and heating value than all the domestic gas served throughout the balance of the entire state outside of the Los Angeles metropolitan area. Upon nine successive days, the gas sendout of the Los Angeles Company exceeded 100,000,000 cu. ft. These days of heavy loads were accompanied by certain reductions of the heating value of the gas from the established standard. However, during the last several weeks, there has been a substantial increase in the available natural gas supply, resulting largely from the recent town-lot drilling in the Huntington Beach oil field. With this additional gas and some new production at Brea Canyon, and also additional gas from the Ventura field, it is hoped that a sufficiently large supply of natural gas will be available next winter, so that even on days of heavy demand, when oil gas must be added, the B.t.u. quality will not fall so low as to cause serious appliance trouble.

Southern Counties Gas Company, which serves its Western District (which includes the cities of Santa Monica, Culver City, Barnes and the portions of Los Angeles known as Venice, Sawtelle and Palms) with gas coming from the Southern California Gas Company's lines at Sawtelle, has filed application with the Commission for a readjustment of rates for service in this district in line with that accorded the other utilities now on a natural gas basis.

GAS GROWTH AT MASON CITY

At Mason City, La., the People's Gas & Electric Company plans to complete several extensions in 1927. A $20,000 addition is to be made to laboratory and store facilities, $12,000 will be spent in plant improvements, and $25,000 will go into main extensions.

WUESTENFELD ASS'T. GEN'L MGR. OF DAVENPORT UTILITY

William J. Wuestenfeld, since 1923 manager of the Ottumwa Gas Company, Ottumwa, Ia., is now assistant general manager of the United Light & Power Company in Davenport. T. C. Roderick of Davenport takes Mr. Wuestenfeld's place at Ottumwa.

COOPER CALENDARS FOR 1927

Another attractive calendar, for 1927, has been prepared by the C. & G. Cooper Company, Mt. Vernon, Ohio. Copies of the calendar may be had from the company by any one desiring them.

WILCOX PLANT TREATING GAS IN PANHANDLE

H. F. Wilcox Oil and Gas Company's absorption plant on the Worley lease in the Gray County fields of the Texas Panhandle is now in operation, with a gas capacity of 15,000,000 cubic feet a day.

PIPE COMPANIES MOVE LOS ANGELES OFFICES

The Pacific States Cast Iron Pipe Co. and the McWane Cast Iron Pipe Co. announce the removal of their office to 608 Subway Terminal Building at 417 South Hill Street, Los Angeles. They were formerly located in the Central Building.

OKMULGEE COMPANY SHOWS 6 PER CENT GAIN

R. F. Hinchey, manager of the Okmulgee Gas Company, Okmulgee, Okla. reports a gain in consumers amounting to six per cent in 1926. The Okmulgee Gas Company is owned by the Oklahoma Natural Gas Company.

90,000,000 CU. FT. GAS WELL

A gasser with a 90,000,000 cu. ft, flow was brought in in the Laredo district of south Texas, in the Carolina-Texas field of Webb county. The well was developed by the W. F. Morgan Company.

Preparing to begin foundation work for the "Public Service Building," which soon will rise in Portland, Ore.

Portland Utilities *to* Have New Home

ON THE front cover of this month's *Western Gas* is a reproduction of an artist's drawing which suggests the general appearance of the Public Service Building now in process of construction in Portland, Ore., being erected to house the offices of the Portland Gas & Coke Company, the Northwestern Electric Company and the Pacific Power and Light Company.

Preparation for beginning foundation work for this $1,500,000 structure, which is to be ready for occupancy by December 1 of this year, is well under way, as the above photograph shows. The building is to rise to a height of 220 feet—the tallest edifice in Portland—and is of steel and concrete construction. Its first two floors will cover the entire half-block area of its site—the east side of Sixth Street between Taylor and Salmon Streets, and the remaining thirteen and a half floors will occupy the central 1000 feet of the location. Extension upward as far as the thirteenth floor can be made to the first two stories as future need requires.

ARCHITECTURAL FEATURES

In every respect the building is to be the modern utility home, of Italian Renaissance style, with marble floors and wainscoting in corridors, and with exterior facing of terra cotta and granitex brick. Five Micro leveling signal control elevators of 800 feet per minute speed are to be installed.

The first basement will be utilized by the Portland Gas & Coke Company and the Northwestern Electric Company for storerooms and used appliances. The second basement will be utilized by the Northwestern Electric Company for a sub-station.

On the main floor will be located the salesrooms of the Gas Company and the Northwestern Electric Company, the former having its salesroom on the Salmon street side and the latter on the Taylor street side. The lobby will be of marble with an ornamental ceiling. Space on the main floor has also been provided for information and order clerks, tellers, cashiers, etc., of both companies.

On the mezzanine floor will be located the personnel of the sales departments of both companies.

Both companies will use the second floor, provision having been made on this floor for the office manager and his assistants, as well as the personnel of the bookkeeping bureau, credit and collection bureau and contract bureau. There also will be on this floor a bookkeeping machine room, addressograph room and telephone exchange.

EMPLOYEE FACILITIES

The third floor will be given over to the employees of the three companies, provision having been made for reading rooms, doctor's office, dispensary, cot room, women's and men's lounging rooms, dining room, kitchen and an assembly room, having a seating capacity of 350 persons.

The fourth floor has been reserved for the operating department of the Gas Company and on this floor will be located the offices of the general manager, general superintendent, land and claim agent, purchasing department, cost engineers, plant construction department and the mains and service department.

The fifth floor will be occupied by the operating department of the Northwest Electric Company and the sixth floor by the Operating and Engineering departments of the Pacific Company.

Part of the seventh floor will be utilized by the Investment department, that part of the Treasury department dealing with payrolls and stockholders' records, and by the Northwest Gas & Electric Equipment Company. The remainder of the space on this floor will be rented until such time as it is needed for our own purposes.

All of the eighth floor will be utilized by the Treasury departments of the Gas Company, Northwestern Electric Company and Pacific Company.

The ninth to fourteenth floors inclusive will be leased to outside tenants. On the fifteenth floor office space has been provided for the board of directors and the executive and legal departments of the three companies.

The roof of the building will be attractively finished with a floor of green tile and in addition to a drafting room for the engineering department of the Pacific Company there will be artistic studios which are in demand.

TULUOL PRODUCTION BEGUN BY PORTLAND GAS & COKE

The production of Tuluol which is absorbed from the gas with the benzol is being undertaken by the Portland Gas & Coke Company. This product, which was much in demand during the war for manufacture of high explosives and commanded a very high price, subsequently became as low in price as benzol and therefore was not worth separating from the benzol used as motor fuel considering that quantity is only about 2 per cent of the refined product. The use of Tuluol in the manufacture of pyroxylin lacquers for automobiles and furniture has again brought it into demand and a profitable market for it exists on the Pacific Coast.

C. H. DICKEY BACK TO COAST AFTER EASTERN TRIP

C. H. Dickey, president of the American Meter Company, and vice-president of the Southern Counties Gas Company, returned to the Pacific Coast on January 14, following an extended business trip to New York City and other eastern cities. He arrived in Los Angeles on January 19 and attended the annual dinner given by President F. R. Bain to 104 officers, directors and employees of the Southern Counties Gas Company.

WESTERN GAS EQUIPMENT CORPORATION ORGANIZED

A new firm, the Western Gas Equipment Corporation, with headquarters at 1298 Bryant Street, San Francisco, has been organized and incorporated for the purpose of handling the R. G. T. Gas Filter on the Pacific Coast. Wm. D. Dickey of the Pacific Meter Works is president and K. C. Tomlinson, secretary and treasurer of the firm.

FIGURES SHOW 1926 BIG YEAR IN SAN ANTONIO

In 1926 the San Antonio Public Service Company, San Antonio, Tex., added 2,450 new gas services, and 3,860 new gas meters, the extensions requiring about 32 miles of pipe.

E. C. WOOD AGAIN CHAIRMAN OF AUTOMOTIVE ENGINEERS

E. C. Wood, superintendent of transportation for the Pacific Gas and Electric Company in the San Francisco division, has again been elected chairman of the Society of Automotive Engineers for California.

M. L. WIAND DIES

M. L. Wiand, former manager of the Nowata County Gas Company, Nowata, Okla., and later, of the Dewey Gas Company, Dewey, Okla., died recently in Cushing, Okla.

A. B. COLLINS PROMOTED

A. B. Collins, Bartlesville, Okla. salesmanager for Henry L. Doherty & Company, has been promoted to the post of manager of the Buffalo, N. Y. securities office of the Doherty organization.

MID-WEST SALES CONFERENCE DUE FEBRUARY 16-17-18

At the January 17 meeting of the Mid-West Sales Council of the American Gas Association, held at the Peoples Gas Building, Chicago, it was decided that a Mid-West Sales Conference should be arranged for February 16, 17 and 18. The conference was set at this early date in 1927 in order to permit those attending to apply the knowledge they glean in the 1927 sales programs of their individual companies.

After some discussion the Council decided that the Mid-West Sales Conference should include the states of Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, and Wisconsin; Chicago was selected as a logical central point for the meeting.

Subjects discussed at the conference will be confined to sale of gas for domestic use, including househeating. The major topics decided upon were central house heating, auxiliary heating (including garage heating), selling gas to prospective home builders, water heating, laundry equipment, incineration, sales of Blue Star Approved Appliances, selling gas ranges (and the relation of home service thereto) refrigeration, supervising salesmen and sales methods, window and store displays as an aid to sales.

J. W. West, Jr., represents A. G. A. headquarters in the work of the Mid-West Sales Council. H. L. Brown has been appointed as the Council's local secretary.

HOUSTON GAS AND FUEL CO. HAS ACTIVE PERIOD

Since natural gas was introduced into Houston, Texas, on June 1 of 1926, about 4,000 meters have been added to the system of the Houston aGs and Fuel Company, and 64 miles of mains have been laid since January 1 of last year. The company, since natural gas service began, has either made or contracted to make improvements totalling $900,000 in value. Industrial extensions cost $100,000; domestic extensions called for $450,000; bringing gas from the transmission line to the distribution plant cost $370,000, and projects to cost $80,000 are still to be furthered.

Changing over to natural gas the company adjusted 16,000 gas heaters and sold 1613 others. The company's industrial load amounts to about 4,000,000 cu. ft. daily.

CONTROL OF GAS UTILITIES INC., IN NEW HANDS

By purchase of most of the common stock of the Gas Utilities, Inc., that organization of eight gas companies, distributed among four states, has come under the control of the Associated Gas & Electric system. Sioux Falls Gas Company, serving Sioux Falls, South Dakota, was one of the utilities involved.

HILL, HUBBELL & CO. HAS NEW FACTORY BUILDING

Hill, Hubbell & Co., San Francisco manufacturer of paints and varnishes, has constructed an additional one-story concrete factory building at the corner of Army Street and San Bruno Avenue. The building, which will be given over to varnish manufacture, contains 5,200 square feet of floor space.

RILEY ASSUMES WORK OF GAS JOURNAL EDITOR

Henry M. Riley, Baltimore, Md., has succeeded Ismar Ginsberg as editor of the American Gas Journal. Mr. Ginsberg withdrew to devote more time to his consulting practice. He will henceforth act as associate editor, in a contributing capacity.

Southwest Division, N.G.A. *in* Organization Meeting

THE organization meeting of the Southwest Division of The Natural Gas Association of America was held in Tulsa, Okla., January 11. More than fifty natural gas producers and distributors and supply men were present.

The meeting formally ratified the action of the committee appointed by the Association to set up the divisional organization and decided to hold the first regional meeting in Dallas, Tex., in April. The exact date is to be set by the officers of the Association in the Division.

A committee on membership was created with the following named men as its nucleus: Carl J. Minnig, Phillips Petroleum Co., Bartlesville; T. J. Heard, Reserve Natural Gas Co., Shreveport; Elmer F. E. Schmidt, Lone Star Gas Co., Dallas; Fred Karr, The Gas Service Co., Kansas City, Mo.; E. A. Clark, Oklahoma Natural Gas Corporation, Tulsa; Keith Clevenger, The Empire Companies, Bartlesville; A. W. Leonard, Devonian Oil Co., Tulsa; H. C. Morris, Dallas Gas Co., Dallas.

The meeting was presided over by N. C. McGowen, vice-president of the Association and ex-officio chairman of the Southwest Division. George McQuaid is secretary of the Southwest Division.

Discussion of the objectives and setup of the Divisional organization was led by J. F. Mason of the Fort Worth Gas Co. It was the general opinion of those present that a number of working committees should be set up within the Division to cooperate with the similar committees of the headquarters organization. This subject will be further considered and action will probably be taken to that end at the regional meeting to be held in Dallas prior to the general convention at Cincinnati.

FRED B. MUELLER

Early in January came the announcement of the death in Decatur, Ill., of Fred B. Mueller, first vice-president of the Mueller Company. For over thirty years Mr. Mueller, as field manager of the Mueller sales force, traveled over the United States, establishing an extensive acquaintance within the gas, water and plumbing trades. His death is a regret to a host of business and personal friends all over the country. Mr. Mueller died at the age of 64, following a lingering illness of some two years' duration, though his last critical illness kept him bedfast for only two weeks.

F. B. Mueller

MAY BRING GAS TO MILES CITY AND TERRY, MONT.

According to news reports the Montana-Dakota Power Company will pipe natural gas to Miles City, and if pending plans carry through will also lay a line during the summer of 1927 to bring gas to Terry, Mont.

EXTEND GAS LINES AT ALTUS

Southwestern Gas & Fuel Company the latter part of January completed extensions to its gas system in Altus, Oklahoma, to bring service to about 80 additional families.

MIDWAY CASTAIC GAS LINE IN OPERATION

On January 15 the first delivery of gas was made through Midway Gas Company's new sixteen-inch high-pressure transmission line, delivering from Castaic Junction to their Glendale terminal station. The new main, twenty-five miles in length, is delivering additional gas from the Ventura Avenue field, and from the Buena Vista and Elk Hills fields, near Taft, to the Southern California Gas Company, the Midway's associate, for distribution in the Los Angeles metropolitan area.

This line supplements two twelve-inch mains which have been transmitting gas from Castaic Junction, and will increase the system's capacity from forty-four million to sixty-five million cubic feet of gas a day.

The line is a continuous welded system, and called for the expenditure of approximately six hundred thousand dollars. Operation of the new main is coincident with the completion of Midway Gas Company's new twenty-eight hundred horsepower compressor station in the Ventura Avenue field.

MILDEST WINTER SHOWN IN PORTLAND WEATHER RECORD

The weather bureau records for Portland show that the average temperature for 1926 was higher than in any year since the establishment of the bureau in 1872. The winter has been unusually mild with the exception of a few days in the middle of December. The Portland Gas and Coke Company had an increase of 17.5 per cent in output for the month of December which, taking into account the reduction in leakage resulting from the extensive work done on the distribution system in 1926, is very satisfactory. The maximum daily sendout for 1926 occurred on December 14th and was 23316 M.C..F with a mean temperature for the day of 22°F.

BITUMINOUS COAL CONFERENCE PROCEEDINGS SOON READY

The published proceedings of the International Conference on Bituminous Coal held under the auspices of the Carnegie Institute of Technology from November 15 to 18, 1926, will be available sometime during February or March, according to an announcement from the institution. The book will contain the full reports of about 43 papers read at the conference, the discussions, and the list of delegates. Orders for copies of the published proceedings should be sent to Arthur C. Jewett, Director of the College of Industries, Carnegie Institute of Technology, Pittsburgh, Pa. The price is $7.00 a copy.

METTLER COMPANY HAS NEW CATALOGUE ON BURNERS

Lee B. Mettler Company, 406 S. Main, Los Angeles, Calif., has just issued a unique catalogue which completely covers the types of burners manufactured by this concern. A copy of the catalogue will be mailed on request.

50,000,000 CU. FT. GASSER FEEDING MUSKOGEE SYSTEM

The new 50,000,000 cu. ft. gasser brought in by the Somerville Oil Company, north of Taft, Okla., has been hooked into the Muskogee mains, and is furnishing most of the gas consumed by that city.

OLD GUARD BANQUET

On Wednesday evening, February 2, the fifteenth annual banquet for the Los Angeles Gas & Electric Corporation Old Guard will be held. There is a membership of 322 in the Old Guard this year.

Building Merchandise Peaks *where* Valleys Were

Our sales organization was carefully instructed and told exactly what support was being thrown into the campaign. Our gas heater displays were neatly rearranged with display cards tieing in with the broadsides, the letters and the display advertising. Newspaper advertising was utilized during the latter part of September and October.

Then we called a sales meeting, outlined the plans in detail to all sales representatives, offered them a liberal, flexible selling policy, and here are the results:

1925	*Heaters Sold*	1926
45	September	59
242	October	417
228	November	412
129	December	775
644	*Total*	1663

During December when our gas heater sales normally decline, we resorted to the third piece of literature, a door-knob hanger with a cash value of $2. We hung several thousand of these door-knob hangers on the front doors of our customers. Just what proportion of the buyers who utilized these $2 cash hangers would not have become purchasers of heaters but for this merchandising plan we are unable to determine, but we do know that Santa Monica sold 64 heaters, Pomona 21, Covina 9, Ontario 7, San Pedro 19 and Santa Barbara 12, via the door-knob hanger route.

The Whittier district as well as the north Orange County territory are making use of the above merchandising method during January and February. We accordingly anticipate additional gas heater sales in these sections because of this stimulating effort. We know that our heater sales are still continuing very much to the company's satisfaction because we have merchandised consistently and persistently since September 15. A few figures at this time will illustrate the point of putting forth concerted sales effort rather than following the easier policy of "just selling."

Let us consider two heating seasons, the first from July 1, 1925, to June 30, 1926, and the second from the latter date to the end of 1926. During the former year, a twelve-month period, our heater sales totaled 815. Contrast that total with the sales for the present season, which, at present writing, is only half way over, with January, February and March, fairly active heater months, still to run. To December 31 last, we sold 1663 heaters, more than double last year's entire output.

During the year 1925 the company placed 1129 first class ranges in the homes of as many consumers on our lines. In other words, we sold only one gas range to each 92.4 consumers on our system.

During 1926, however, due to stimulating sales efforts, we placed 1969 new ranges in our territory. With 111,945 consumers on our system we therefore sold one range to every 56.8 consumers, a marked gain of 63 per cent over our 1925 sales activities.

A GOAL FOR 1927

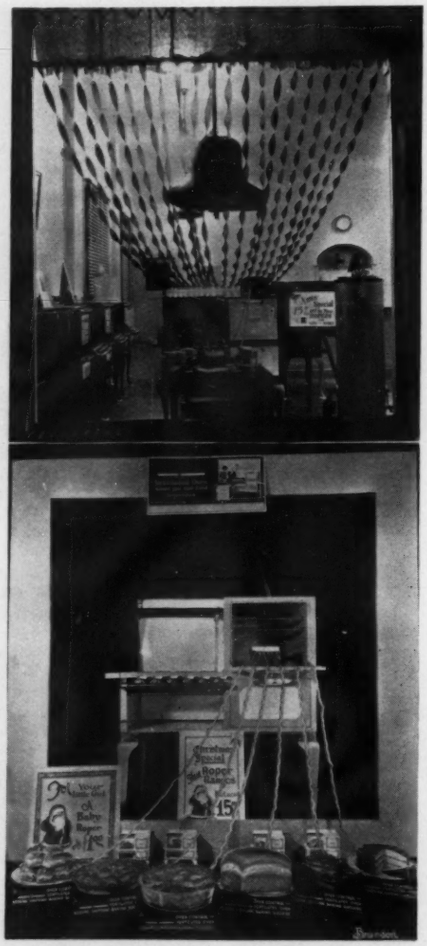
A strong merchandising policy during the past year has enabled the company to increase its merchandise business almost $100,000. Our 1925 sales totaled $135,508, as compared with $230,279.02 for 1926. The goal our sales organization has set for the present year is $330,000, a third of a million dollars.

For 1927 we have mapped out a consistent merchandising campaign. Certain appliances will be featured at varying seasons of the year with ranges during December, January

(Continued from Page 21)

and February, while heating equipment will be pushed strenuously between September and December. In each campaign direct-mail and display advertising will play an effective part because without this strong auxiliary support no effort would be successful.

What is the object of this selling and sales effort on the part of the company? The object is that one thing which is sweetest music in the ears of all gas utility executives,



Two typical Christmas window displays at Southern Counties district offices. Covina (above), and Monrovia (below).

namely—greater consumption on existing mains! Surely this is certain to follow when 2000 new, approved heaters, 2000 ranges, some water heaters and a number of miscellaneous appliances are placed on the lines of the company during a twelve-month period.

We know that a consumer using a first class gas range, heater, water heater and possibly other gas burning appliances which are giving her entire satisfaction, will be less willing to listen to the romantic tales of the salesman of some other fuel than were her appliances unsatisfactory, uneconomical and unattractive in her home. Sell her the oven-controlled range, the finest gas heater on the market and an automatic water heater which produces hot water when she has need for it and she will not be weaned away to other types of fuel.

The day of the cheap, one-season gas appliance is over. A continuation of "price" merchandising in no far distant period would mean a serious loss of revenue to the industry, brought about by a sharp drop in domestic consumption. The modern housewife cannot be expected to use a large volume of gas when her ten-year-old gas range is a nightmare to her and when her gas heater resembles a relic of the ark. She prefers to toast, percolate, fry, boil and even heat on the more attractive and inviting appliances of an aggressive, fast-growing rival industry—appliances which she can buy at any drug store, mercantile place or shop. This she can readily do with her budgeted income on easy term payments. Fifty cents places the appliance in her home and the gas company has lost perhaps a small but definite amount of business. Thus the process goes on year after year, and what are we doing to halt it!

One certain answer to the question is to sell her approved and attractive gas appliances which add comfort and beauty to her home. In this day of automobiles, radios, movies and luxuries on every hand, no housewife will hesitate to invest a reasonable sum of money in as important a home furnishing as a beautiful, enameled, automatic gas range! And the logical place for her to buy it is at the gas company's display office where the courteous assurance of many years of service goes with each purchase.

GAS FURNACE MEN MEET IN ANNUAL BANQUET

ON January 26 the Gas Furnace Association of Southern California held its annual convention at the Elite Cafe, Los Angeles, combining an evening banquet with a program of speaking, stereoptican lecture and musical entertainment. The meeting was attended by nearly 100 members and friends of the association.

Jesse A. Martin, the organization's president, delivered an address of welcome; A. C. Horner of the Portland Cement Association spoke on building inspection, with special reference to the association's code for gas furnace installation; H. L. Masser, gas engineer of the Los Angeles Gas & Electric Corp., spoke to the topic "The Gas Furnace Association and the Utility Company"; A. U. Preston read a paper giving a nationally prominent banker's interpretation of the trade association's value; Elliott C. Hensel delivered a talk on salesmanship under the colorful title "Guts, Glee and Glue"—the requisites of the successful salesman; and Bert Scott paraphrased "The Einstein Theory" in humorous vein to the amusement of everyone present. Geo. Finney, secretary-treasurer of the Gas Furnace Association, presented a number of stereoptican views of early days in the gas industry, and of various phases of gas appliances.

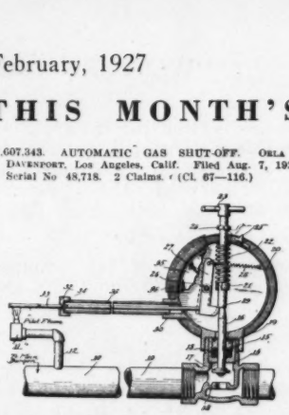
In its comparatively short existence the association has performed some important services for which recognition is being accorded it, as demonstrated by the turnout at the January banquet.

CRAIG, COLO., MAY GET GAS

Craig, Colo., may have natural gas, as a result of the project to construct an eight-mile gas line from the Moropos gas field to the Moffat Oil field for oil drilling operations.

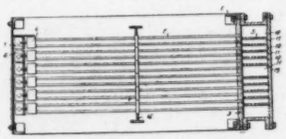
THIS MONTH'S PATENTS PERTAINING TO THE INDUSTRY

1,607,343. AUTOMATIC GAS SHUT-OFF. OBLA J. DAVENPORT, Los Angeles, Calif. Filed Aug. 7, 1925. Serial No. 48,718. 2 Claims. (Cl. 67—116.)



1. In combination with a pilot light for a burner and a fuel pipe leading to the pilot light and burner, a valve in the fuel pipe having its closure provided with an extended stem, a housing through which said stem extends, spring means disposed within said housing urging said stem into closed position, a pivoted dog disposed within said housing engageable upon said stem for holding the stem in open position, spring means urging said dog to disengage from said stem, and a heat expansible rod adapted to be heated by the pilot light and engageable upon said dog so as to hold the dog in engagement with the stem, said housing carrying a catch engageable upon said stem and being provided with a window, whereby under normal conditions when the pilot light is burning, the rod will be heated thereby and caused to be expanded, thus maintaining the dog in engagement with said stem, but if the pilot light should go out, allowing the rod to cool and contract, the dog will disengage said stem, permitting the valve to be closed.

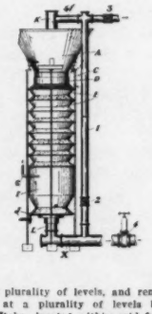
1,600,013. HEAT EXCHANGER. JOSEPH PRICE, New York, N. Y., assignor to The Griscom-Russell Company, New York, N. Y., a Corporation of Delaware. Filed Apr. 12, 1924. Serial No. 705,982. 13 Claims. (Cl. 257—239.)



1. Heat exchange apparatus of the class described, comprising a passage for the gas being treated, a plurality of fluid conveying elements extending into heat exchanging relation with the gas traversing the apparatus to collectively constitute the heat transferring unit of the apparatus, each of said elements comprising a number of tubes greater than two interconnected at one end of the element and having a plurality of heat transferring fins, each fin spanning all of the tubes of an element and means for dividing the tubes of the element into two passes containing respectively an even and odd number of tubes.

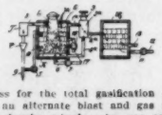
1,598,217. GAS-MAKING AND CARBONIZING APPARATUS AND PROCESS. WILLIAM W. ODELL, Minneapolis, Minn. Filed Dec. 17, 1923. Serial No. 681,250. 14 Claims. (Cl. 202—1.)

1. A process for carbonizing solid fuel and removing the gaseous products, consisting in passing said fuel substantially continuously in a downward direction through a confined combustion zone, igniting the fuel in said combustion zone during its downward passage and maintaining a state of ignition therein by drawing air from without into an outer substantially cylindrical surface of



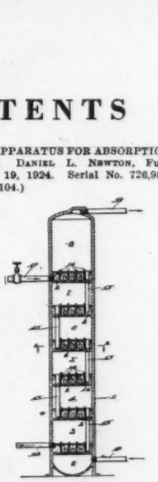
said fuel at a plurality of levels, and removing the resulting gases at a plurality of levels by exhausting through gas offtakes located within said fuel.

1,598,473. COMPLETE GASIFICATION OF BITUMINOUS FUEL. ALBERT BRISSIG, Vienna, Austria. Filed Sept. 25, 1922, Serial No. 590,498, and in Austria May 25, 1921. 4 Claims. (Cl. 48—73.)



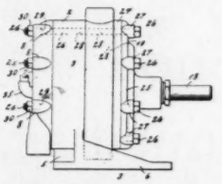
1. A process for the total gasification of bituminous materials in an alternate blast and gas making water gas process whereby mixed water gas and distillation gases are produced, which comprises distillating bituminous material in a distillation zone, alternately blasting with air and gasifying with steam the residual material from said distillation zone in a gasification zone, withdrawing the blast gases generated during the air blast period, igniting said blast gases, withdrawing a portion of the mixed gas formed in the process, imparting a portion of the sensible heat of the blast gases to said mixed gas, passing said mixed gas through the distillation zone only, imparting a portion of the sensible heat of the blast gases to steam, superheating the steam to a lower temperature than that to which the mixed gas is superheated, and passing said steam through the gasification zone to form water gas.

1,608,416. APPARATUS FOR ABSORPTION OF HYDROCARBONS. DANIEL L. NEWTON, Fullerton, Calif. Filed July 19, 1924. Serial No. 726,987. 2 Claims. (Cl. 261—104.)



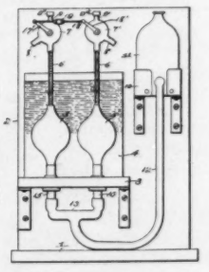
1. In an apparatus for a continuous process of absorbing condensible hydrocarbon vapors contained in casing head gas by means of a liquid medium and in which said medium is conducted in one direction and the gas in the opposite direction, comprising a plurality of compartments vertically arranged in series, each of said compartments being adapted to contain said liquid medium and having a bottom provided with perforations through which the gas enters, a cylindrical recirculation tube open at the top and provided with side openings near the bottom and vertically disposed over each of said perforations, said tubes being arranged in approximately parallel rows, baffle plates between said rows of tubes extending above the level of the liquid medium, and means for maintaining the level of the absorbing medium at a height substantially twice the height of said tubes.

1,607,383. PUMP OR COMPRESSOR. EDWARD LUPFER AUSAND, Teaneck, N. J., assignor to American Radiator Company, New York, N. Y., a Corporation of New Jersey. Filed May 25, 1923. Serial No. 641,331. 7 Claims. (Cl. 230—30.)



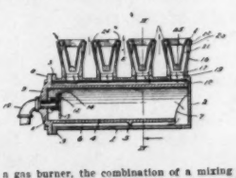
1. In a structure of the character described, a cylinder, a cylindrical bearing member concentric with said cylinder, a cylindrical rotor sleeve mounted on said bearing member, vanes having their inner ends supported on said rotor sleeve for movement relative to each other and having their outer ends adjacent the cylinder wall, a rotatable driving member surrounding the rotor sleeve and eccentric to said cylinder, said member internally making contact with the rotor sleeve and externally making contact with the inner peripheral wall of the cylinder and having openings through which said vanes extend, said rotatable driving member together with the rotor sleeve and cylinder forming chambers inside and outside of said member, each of said chambers having inlet and outlet ports located respectively on opposite sides of the point of contact of the driving member with the rotor sleeve and the cylinder, and a driving shaft having driving connection with said rotatable member.

1,608,812. GAS-DENSITY APPARATUS. DACHS M. REEVES, Rantoul, Ill. Filed June 27, 1923. Serial No. 648,043. 12 Claims. (Cl. 265—44.)



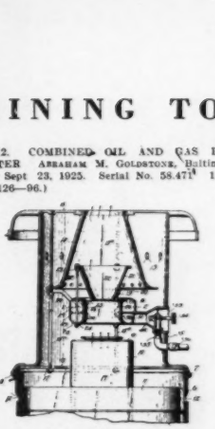
1. In a device for measuring gas densities, in combination, gas containers provided with emission orifices, and means for simultaneously placing the gas in each of said containers under equal pressure.

1,607,104. LOW-PRESSURE GAS BURNER. WALTER M. SHAW, Moline, Kans. Filed Dec. 7, 1925. Serial No. 73,722. 2 Claims. (Cl. 158—104.)



1. In a gas burner, the combination of a mixing chamber, a series of rectangular burner boxes formed with outwardly and upwardly inclined walls at all of their sides and having their upper adjacent edges spaced slightly apart to form air conduits, and an outwardly and upwardly inclined spreader within each of said boxes and spaced therefrom, the upper edges of said spreaders being in a plane above the upper edges of the boxes.

1,599,412. COMBINED OIL AND GAS BURNING HEATER. ABRAHAM M. GOLDSTONE, Baltimore, Md. Filed Sept. 23, 1925. Serial No. 58,471. 10 Claims. (Cl. 126—96.)



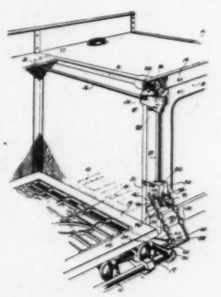
1. A stove including an upper body-member, a lower body-member, these body-members being joined to one another by means that permits their joint to be opened for gaining access to their interior, an oil-tank and oil burner in said lower body-member, and a gas burner in and secured to the upper body-member in position to be preheated by said oil burner.

1,607,355. THERMOSTATIC BURNER CONTROL. HERBERT J. LONG, New Brunswick, N. J., assignor to The Kompak Co., New Brunswick, N. J. Filed Aug. 13, 1923. Serial No. 657,082. 5 Claims. (Cl. 67—116.)

1. A gas burner comprising a tube provided with an inlet and a flame orifice, a composite rod structure projecting into said tube and having one part adapted to close said inlet, a spring normally tending to move said rod structure toward the inlet capable of being closed thereby, means for limiting such movement of said rod structure, said rod structure extending out of said tube to

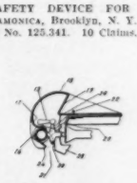
enable its manipulation against the action of said spring to open said inlet, said tube and rod structure having different coefficients of expansion whereby any heat generated by the flame against said tube will hold the inlet and the rod structure in their open relationship.

1,606,987. OVEN-HEAT REGULATOR. EMIL L. CLAUS, Milwaukee, Wis., assignor, by direct and mesne assignments, to Milwaukee Gas Specialty Company, Milwaukee, Wis., a Corporation of Wisconsin. Filed Nov. 10, 1923. Serial No. 673,953. 14 Claims. (Cl. 236—15.)



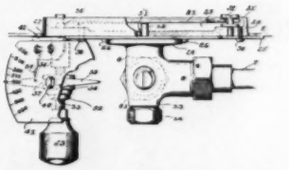
1. In a device of the character described including an oven having a substantially rigid frame at one side and a burner for heating the interior thereof, means for regulating the flow of fuel to the burner in proportion to the temperature of said oven and including a member having a relatively high co-efficient of expansion and adapted to be influenced by the heat of the oven, means connecting one end of said member with said rigid oven frame, the other end of said member being passed outwardly of the oven, a second member having a relatively low coefficient of expansion and positioned in a neutral zone out of the influence of the heat of the oven, means connecting the second member with the first-mentioned member, a control valve for regulating the flow of fuel to the over burner, and a connection between said control valve and said second member whereby expansion of said first-mentioned member decreases the flow of fuel to the burner and contraction of said first-mentioned member increases the flow of fuel to said burner.

1,607,590. SAFETY DEVICE FOR GAS STOVES. DOMENICO LAMONICA, Brooklyn, N. Y. Filed July 28, 1926. Serial No. 125,341. 10 Claims. (Cl. 126—42.)



1. In a device of the class described, the combination, with a hood member, of two end plates forming passages adapted to be inserted over a gas stove supply pipe, providing a pivotal support about which the device may be tilted from operative to inoperative position.

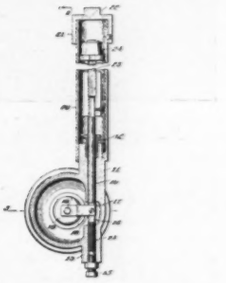
1,599,554. OVEN-HEAT REGULATOR. EMIL L. CLAUS and WALTER E. CLAUS, Milwaukee, Wis., assignors, by direct and mesne assignments, to Milwaukee Gas Specialty Company, Milwaukee, Wis., a Corporation of Wisconsin. Filed Nov. 25, 1921. Serial No. 517,823. 11 Claims. (Cl. 236—15.)



1. In a thermocontrol device, a member sensitive to temperature changes, means securing said member whereby the same will flex when heated, means actuated by a flexing of said member to operate a heater controlling device, and a baffle member protecting said member to restrict the circulation of gases thereabout.

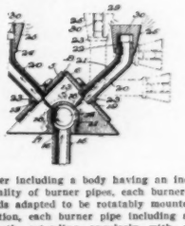
1,610,020. GAS SHUT-OFF VALVE. JAMES S. MCILHENNY, Washington, D. C. Filed Aug. 15, 1925. Serial No. 50,523. 5 Claims. (Cl. 137—139.)

3. A device of the character described, comprising a casing formed with an integral hollow extension at each side, a valve stem fitted within said extensions and casing and extending vertically, a cut-off valve secured to said stem, a tubular casing fitted around the upper end of one of said extensions entirely enclosing the upper end of the valve stem, valve stem locking means fitted in the lower end of the other extension and in contact



with the lower end of said stem, and means within the tubular casing connected to the valve stem for closing the valve by imparting a quarter turn to the valve stem.

1,600,175. GAS BURNER. PAUL C. HUGHES, Tulsa, Okla. Filed Apr. 2, 1926. Serial No. 99,392. 7 Claims. (158—106.)

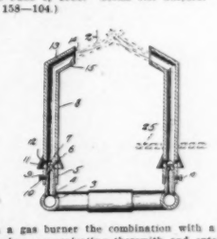


1. A burner including a body having an inclined portion, a plurality of burner pipes, each burner pipe having both ends adapted to be rotatably mounted on said inclined portion, each burner pipe including sections of unequal length extending angularly with respect to each other, and a tip selectively mounted on either end of each burner pipe.

1,609,872. PROCESS OF PURIFYING GASES. JAMES B. GARNER, ROLLA W. MILLER, and GEORGE A. SHANER, Pittsburgh, Pa., assignors to Standard Development Company, a Corporation of Delaware. Filed Dec. 30, 1922. Serial No. 610,035. 16 Claims. (Cl. 23—225.)

1. The improvement in the art of removing sulfur compounds, cyanogen compounds, and other impurities from gases, which comprises treating a gas containing such impurities with a liquid-carried purifier in the presence of an agent promoting the fuming tendency of the liquid.

1,607,106. BURNER. SAMUEL A. STUM, Provo, Utah. Filed June 3, 1926. Serial No. 113,495. 4 Claims. (Cl. 158—104.)



1. In a gas burner the combination with a manifold and nipples communicating therewith and extending upwardly therefrom, said nipples being tapered and having orifices in their upper ends, of burner tubes frictionally engaging and supported by the tapered nipples having air holes adjacent the upper ends of the nipples, means carried by the tubes and engaging the nipples for holding the tubes against rotation, an apron extending around each tube and the air holes therein for deflecting moisture from the openings, the upper ends of the tubes being arranged in pairs for directing jets of flame upwardly along converging lines to meet and mix at points between said ends, the outlet openings in the ends of the tubes being disposed in vertical plane.

Station A of San Diego Consolidated Gas & Electric Company's properties.

1926 Gas Records *in* West Show Gains--1927 Expansion Planned

(Continued from Page 18)

ft., as compared with 1,548,965 M. cu. ft. for 1925.

The utility's chief project last year was extension of service to "Highlands," a subdivision of Edmonton, involving the laying of 7 miles of main and the service of 172 consumers, at a cost of $32,000.

In 1927 the sum of $123,560 will go into construction and betterments, while new wells and field lines will call for $80,867.

VANCOUVER, BRITISH COLUMBIA

Vancouver Gas Company, Ltd., put $404,850 into 1926 maintenance and additions, which was an increase of $81,327 over the year previous.

Miles of main laid, 32.7.

Meters installed, 3,442. Total meters, 29,531.

1926 sendout, 765,804 M. cu. ft.

1925 sendout, 700,397 M. cu. ft.

Service was extended to Point Grey and to part of Burnaby, suburbs of Vancouver, and further extensions to same communities and to South Vancouver will be made in 1927. A healthy population increase of 75,000 was noted in the territory served.

Plant additions included a sulphate of ammonia plant, high pressure blowers, coke elevator plant, superheaters for waste heat boilers—totalling $38,502 in cost.

Budget for 1927 additions is set at $412,000, which will cover cost of two compressors, a governor booster, tar extractor, scrubber washer, station meter, mains, services and meters.

TUCSON, ARIZONA

Tucson Gas, Electric Light & Power Co. expended $90,000 for maintenance and additions, a decrease of $50,000 from 1925.

Distribution mains laid 6 miles.

Meters installed, 1025. Total meters, 4683.

Total 1926 sendout, 133,000 M. cu. ft. Total 1925 sendout, 97,000 M. cu ft.

Generating and boosting capacity was increased in 1926. A 500,000 cu. ft. holder will probably be erected this year.

FRESNO, CALIFORNIA

San Joaquin Light & Power Corp. spent $61,383 on its gas department, somewhat less than in 1925. Returns given were for eleven months ending November 30, 1926. Distribution lines laid, 11.39 miles. Meters installed, 970. Total meters, January 1, this year, 10,270.

1926 sendout (one month estimated) 701,851.2 M. cu. ft.

1925 sendout, 716,598.5 M. cu. ft.

An appropriation of $61,447 for this year will cover costs of new business development at Bakersfield, Merced and Selma and installation of 20 M. cu. ft. generator, and washer at Merced.

LOS ANGELES, CALIFORNIA

For maintenance the Los Angeles Gas & Electric Corp. appropriated $375,921, which fell under the 1925 figure by $84,382. The item additions in 1926 called for $3,282,394, a $1,494,031 decrease from 1925.

Distribution mains laid, 83.73 miles.

Meters installed, 13,718 net. Total meters, 339,736.

1926 sendout total, 19,188,811 M. cu. ft.

1925 sendout total, 17,733,104 M. cu. ft.

Important additions made last year included a 1,500,000 cu. ft. steam driven turbo-compressor at Ducommun St. gas works ($33,000); a feed water heater of 330,000 lbs. water per hour capacity, at Aliso St. Gas Works ($14,500); a 500 gallon boiler feed pump at same Works ($6,000); autos and trucks purchased ($50,000).

The company anticipates a 60,000 population increase in its territory in 1927, which will exceed that of 1926 by 5,000.

The 1927 budget is estimated at $2,500,000, which will be chiefly devoted to distribution department projects, including 100 miles of gas main; 15,000 services; 15,000 meters; and 2,000 regulators.

MIDWAY GAS COMPANY

The Midway's expenditure for maintenance and additions amounted to $1,200,000, which was a gain of $580,000 over the 1925 figure.

Transmission lines laid, 61 miles.

The Midway, which handles gas wholesale for distribution by other companies, transmitted 60,889,978 M. cu. ft. in 1926; 53,038,343 M. cu. ft. in 1925.

Important additions in 1926 were the 8-inch transmission line to Monolith, 33 miles long, built at cost of $350,000; the 16-inch Castaic-Glendale line, 27 miles long, costing $594,000; and the compressor station at Huntington Beach, costing $80,000.

In 1927 the community of Tehachapi will be served, and two units added to each of the compressor stations at Huntington Beach, Brea and Ventura.

SOUTHERN CALIFORNIA GAS CO.

Southern California Gas Company's 1926 expenditure was $3,080,000 for maintenance and additions, an increase of $230,000 over 1925.

Gas lines laid, 181 miles.

Meters installed, 15,550. Total meters, 183,621.

1926 sendout, 40,994,174 M. cu. ft.

1925 sendout, 40,750,871 M. cu. ft.

Population increase in territory was estimated at 80,000 for 1926, with another 75,000 increase due in 1927. In 1926 the company built a 10,000,000 cu. ft. waterless type gas holder at its plant No. 3, Slauson and Western Avenues ($600,000); at same plant was installed one unit electric driven compressor ($45,000).

SOUTHERN COUNTIES GAS CO.

Gross capital expenditures for 1926 came to $1,750,000.

Distribution lines laid, 122 miles.

Meters installed, 7,500. Total meters, 111,945.

1926 sendout, 28,590,726 M. cu. ft.

1925 sendout, 20,899,564 M. cu. ft.

During 1926 were added a 250 h.p. Cooper gas engine driven compressor at Santa Monica, and a 170 h.p. compressor of same type at Ventura. High pressure holders totalling 2,000,000 cu. ft. capacity were installed at Santa Ana, Orange, Sierra Madre and Ontario.

1927 budget, $1,750,000. Laguna Beach and Topango Canyon will be added to the company's lines, and high pressure storage equipment will be put on at San Pedro and Pomona. The cities of Orange, Ventura, Santa Barbara and Sierra Madre will have new gas offices. A 35,000 gain in population over the company's system is estimated, as compared with 33,750 last year.

SAN DIEGO, CALIFORNIA

The San Diego Consolidated Gas & Electric Co., estimates an expenditure in 1926 of $1,000,000 for maintenance and additions to its gas department.

Gas lines laid, 46 miles.

Meters installed, 4,752. Total meters, 48,686.

1926 sendout, 2,161,594 M. cu. ft.

1925 sendout, 2,085,366 M. cu. ft.

Important 1926 additions included the following: New gas compressor ($140,000), station meter ($9,500), secondary steel scrubber ($22,500), tar separator ($6,400), extensions to new customers ($500,000), other additions and betterments to distribution system ($350,000).

Appropriation of $980,000 for maintenance and additions in 1927 has been made.

SAN FRANCISCO, CALIFORNIA

The Pacific Gas and Electric Company's expenditure of $5,700,000 was above that of 1925 by $137,000.

Transmission lines laid, 40.

Distribution lines laid, 340 (estimated).

Meters installed 30,400 (estimated), including 7,900 acquired through purchase of Sacramento Gas Co. Total meters, 418,000.

1926 sendout, 20,263,673 M. cu. ft.

1925 sendout, 18,934,980 M. cu. ft.

A number of major projects were completed in 1926 by the P. G. and E. in its East Bay District. The 10,000,000 cu. ft. waterless gas holder and compressor station were placed in operation on Nov. 10, costing $1,000,000. More than $1,000,000 was spent in extensions to gas system in Oakland, Berkeley and Alameda. A 7-mile high pressure 8-inch line ($90,000) was constructed from Richmond to Sobrante to deliver wholesale gas to Coast Counties Gas & Electric Co.; $350,000 went to additional compressor and generating equipment at the Oakland gas plant. Total expenditure for East Bay system approximated $2,500,000.

At San Francisco the P. G. and E. spent $250,000 for plant equipment at the Potrero Works, and $800,000 for additions to distribution system.

The Marysville water gas plant went into service on Sept. 30, and with the 33-mile line to Oroville reached a combined cost of $455,000.

In 1926 it is estimated that population in P. G. & E. territory gained by 90,000, and 100,000 is the increase expected this year. The Santa Clara gas system was purchased from the municipality in 1926.

With a budget for 1927 set at $4,256,000 for gas department expansion the company will extend service to Live Oak, Gridley, and Biggs in the Colgate Division, at a cost of $202,500. Generating plant expenditures will come to $633,575; distribution and transmission plant capital expenditures to $3,622,375.

STOCKTON, CALIFORNIA

Western States Gas & Electric Company's expenditure came to $179,263, a decrease of $23,494 from 1925.

Gas lines laid, 235.53. Meters installed, 231. Total meters, 13,341.

1926 sendout, 646,049 M. cu. ft.

1925 sendout, 621,071 M. cu. ft.

A $15,000 extension to generator building, and a $7,000 water softener plant for boilers were the chief additions. For $1927, the sum of $286,000 has been allotted, to cover a 12-foot Improved Jones Oil Generator, a building to house generator, a station meter, and two secondary scrubbers.

DENVER, COLORADO

$600,000 was spent by the Public Service Company of Colorado, an increase of $150,000 over 1925.

Gas lines laid, 15 miles.

Meters installed, 1,500. Total meters, 72,000.

1926 gas sales, 3,123,500 M. cu. ft.

1925 gas sale, 3,084,823 M. cu. ft.

Two 12-foot blue gas machines, complete with turbo-blowers, waste heat boilers and accumulator—of 6,000,000 cu. ft. daily capacity, costing $226,000, were added. Also a No. 9 exhauster, 400,000 cu. ft. per hr. capacity ($10,000).

The 1927 appropriation comes to $1,000,000, of which $537,000 will go to install 45 Improved Eq. Coke Ovens of 4,000,000 cu. ft. daily capacity. And two 500,000 cu. ft. gas holders ($200,000) are on the 1927 program, both projects being for Denver.

BILLINGS, MONTANA

Billings Gas Company's expenditures for 1926 were $110,000, which passed 1925 by $90,000. 16 miles of line were laid. 150 meters installed. Total meters, 4400.

Service was extended to Silesia, Edgar and farm districts near Billings, all in Montana. Total sendout was 1,000,000 M. cu. ft. as compared with 960,000 M. cu. ft. in 1925.

RENO, NEVADA

Truckee River Power Company added 169 meters, giving a total of 2,571 on the system. Sendout was 54,639 M. cu. ft., as compared with 55,370 M. cu. ft. in 1925.

EUGENE, OREGON

Mountain States Power Co. spent $31,950, greater by $1,950 than 1925 total. There are 2,576 meters installed, 49 in 1926. Sendout was 67,000 M. cu. ft., about 1,000 M. cu. feet under 1925. $30,000 will be spent extending mains within city limits this year.

PORTLAND, OREGON

Under the head of maintenance the Portland Gas & Coke Co. expended $289,914, exceeding by $48,328 the 1925 sum for maintenance. Additions called for the grand total of $2,634,230, as compared with $787,529 the year before, a gain for 1926 of $1,846,701.

Gas distribution lines laid, 96.8.

Meters installed, 3,815. Total meters, 101,832.

1926 sendout, 4,001,789 M. cu. ft.

1925 sendout, 4,130,888 M. cu. ft.

Service was extended to Metzger, Ore., in 1926, and this year West Linn, Ore., will be added.

A number of important additions to be covered by the 1927 $1,000,000 appropriation include: a generator building ($160,720) of reinforced concrete and steel, to house four 5,500,000 cu. ft. generators; one generator and works connection—$190,000 straight shot oil gas set of 5,500,000 cu. ft. capacity; one exhauster ($12 000) G. E. centrifugal motor driven, 960,000 cu. ft. per hour; three purifiers ($76,250), iron side type, 2,000.000 cu. ft. each per day; one air blower ($25,800) G. E. centrifugal motor driven, 35,000 cu. ft. per minute; one oil pump ($6,240) duplex motor driven, 150 gal. per minute; ten oil heaters ($15,000) combined capacity 125 gal. per minute; oil burners ($8,050) for installation on waste heat boilers, to be used when generators are shut down.

SALT LAKE CITY, UTAH

Utah Gas & Coke Co. laid 7.4 miles of main, installed 739 meters, giving a total of 18,555 meters on the system. Extensions were made to the southern and southeast parts of Salt Lake City, formerly without service.

Total 1926 sendout, 579,497.9 M. cu. ft.

Total 1925 sendout, 535,101.4 M. cu. ft.

A Hortonsphere pressure holder of 220,000 cu. ft. capacity was erected in southeast Salt Lake City in 1926; also a compressor plant, high pressure mains, and a fully equipped playground surrounding the holder. The project cost $70,000. New mains, services, meters, and probable plant additions are contemplated this year.

SPOKANE, WASHINGTON

Spending $34,012, which was $2000 more than the year previous, the Spokane Gas and Fuel Co. installed 100 new services, raising its total meters to 10,396. Total 1926 sendout was 340,283 M. cu. ft., as compared with 311,780 M. cu. ft. for 1925. Plant equipment costing $5,219 was installed. $36,000 will be put largely into main extensions to outlying sections of the city in 1927.

TACOMA, WASHINGTON

The Tacoma Gas and Fuel Company, though unable at this date to give returns on sendout, etc., reported an active year of appliance merchandising.

UTILITY WOMEN ENGAGE IN MERCHANDISING STUDY

Members of the Women's Committee of the Southwestern Light & Power Company, headquarters of which are at Oklahoma City, Okla., are undertaking a cooperative study of appliance merchandising, sales methods and problems.

SALINA GAS LINE COMPLETE

Gas was expected in Salina, Kan., on January 22, the 28-mile pipeline connecting the city with fields to the south having reached city limits on the 12th of January, with three miles more to be laid in the city. The Hope Engineering Company is constructing the line.

LOWER GAS RATES FOR MUSKOGEE GAS SERVICE

W. H. Crutcher, manager of the eastern division of the Oklahoma Gas & Electric Company, has announced a reduction in rates for natural gas service in Muskogee, Okla., the second made by the company within a year. Rates were lowered from 75 cents a thousand for the first 5000 cubic feet to 72 cents, and 65 cents a thousand for the next 95,000 feet. Over 100,000 feet is charged at the rate of 20 cents a thousand.

GAS IN CITY LIMITS

Winfield, Kan., is using gas from a well developed within her own city limits.

BUREAU OF STANDARDS HAS NEW PUBLICATION

The Bureau of Standards announces a new complication of the Federal and State laws relating to weights and measures which is nearing completion. It will contain 1000 pages or more and will be sold at the Government Printing Office at the usual nominal charge for Government publication.

NEW ORLEANS COMPANY HAS ATTRACTIVE FOLDER

"A Near Century of Gas in New Orleans" is the title of a small, attractively prepared booklet gotten up by New Orleans Public Service, Inc., which company distributes gas in that Louisiana community. The booklet, as its name implies, is a colorful review of the growth of the gas industry in New Orleans.

AUTOMATIC CONTROL ON TURBINE ADOPTED BY R. G. & C. CO.

The automatic control installed experimentally on the steam turbine driven electric generators of the Portland Gas & Coke Company proved so successful that it is now in regular operation. This control governs the load on the turbine to conform to steam pressure fluctuations. With waste heat boilers these fluctuations are frequent and run as much as fifty pounds in range. The turbine is set to carry only sufficient load at steam pressures less than normal to insure that it will not "motor". As the steam pressure rises above normal the load on the turbine is increased by the control and reduced again when the steam pressure drops. Fluctuations have been reduced to between fifteen and twenty pounds in range and the blowing of safety valves eliminated.

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AND
Hydrometers

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Association Committee Set-up *for* 1927

(Continued from Page 23)

Duncan Stewart, Pacific Gas & Electric Co., San Jose
C. Elton White, San Diego
Ludwig Rosenstein, Cons. Chem. Engr., San Francisco

Condensing and Scrubbing

S. C. Schwarz, Portland Gas & Coke Co., Portland—Chairman
Ted Rosebaugh, Pacific Gas & Electric Co., San Francisco
A. R. Fox, Western States Gas & Electric Co., Stockton
J. K. Lehman, Portland Gas & Coke Co., Portland

Dust & Moisture Control

K. C. Tomlinson, Pacific Meter Works, San Francisco—Chairman
J. E. C. Currens, Western States Gas & Electric Co., Stockton
J. M. Dickey, Pacific Gas & Electric Co., San Francisco
H. J. Forward, Albequerque Gas & Electric Co., Albequerque, N. M.
J. R. Moore, Southern California Gas Co., Los Angeles
R. M. Ranyard, Southern Counties Gas Co., Los Angeles
H. M. Thomas, Pacific Power & Light Co., Walla Walla, Wash.
J. T. Sullivan, Truckee River Power Co., Reno
C. E. White, San Diego Cons. Gas & Electric Co.
N. H. Wardale, Portland Gas & Coke Co., Portland

Compressor Plants

A. B. Newby, Midway Gas Company, Taft—Chairman
C. F. Mabee, Southern Counties Gas Co., Santa Paula
C. S. Pool, Ventura Fuel Co., Los Angeles
J. E. Wallace, Industrial Fuel & Supply Co., Anaheim, Calif.
T. C. Wallace, Southern Counties Gas Co., Ventura
S. S. Donaldson, Midway Gas Co., Los Angeles

Measurements

F. A. Hough, Southern Counties Gas Co., Los Angeles—Chairman
G. Reece, Southern Counties Gas Co., Los Angeles
A. E. Madden, Southern Counties Gas Co., Los Angeles
R. M. Bauer, Midway Gas Company, Los Angeles
R. L. Cook, Midway Gas Co., Taft, Calif.
B. M. Laulhere, Midway Gas Co., Santa Fe Springs, Calif.
T. K. M. Smith, Industrial Fuel Supply Co.
J. O. Wiley, Westcott & Greis, Los Angeles

Load Factors

Wm. Henderson, Los Angeles Gas & Electric Corp.—Chairman
A. R. Bailey, Los Angeles Gas & Electric Corp.
R. C. Boughton, Los Angeles Gas & Electric Corp.
L. L. Biggs, Southern California Gas Company, Los Angeles
W. F. Brandt, Los Angeles Gas & Electric Corp.
Otto Goldamp, San Diego Cons. Gas & Electric Co.
V. W. Harper, Portland Gas & Coke Co., Portland
C. G. Fiscus, Western States Gas & Elect. Co., Stockton
W. F. Pape, Pacific Gas & Electric Co., Oakland
S. C. Singer, Southern California Gas Co., Glendale

Materials and Methods

R. C. Boughton, Los Angeles Gas & Electric Corp.—Chairman
W. de Waard, San Diego Cons. Gas & Electric Co., San Diego
R. H. Hargreaves, Pacific Gas & Electric Company, San Jose
M. E. Waite, San Diego Cons. Gas & Electric Co., San Diego
S. H. Graf, Oregon State Agricultural College, Corvallis
A. E. Hall, Coast Counties Gas & Electric Co., San Francisco
W. M. Henderson, Los Angeles Gas & Electric Corp., Los Angeles
A. R. Bailey, Los Angeles Gas & Electric Corp., Los Angeles
F. H. Coble, Southern California Gas Co., Los Angeles
N. R. McKee, Southern Counties Gas Co., Los Angeles
Frank Keller, Los Angeles Gas & Elect. Corp., Los Angeles

Unaccounted for Gas

B. G. Williams, Southern California Gas Co., Los Angeles—Chairman
H. C. Abbott, Southern California Gas Co., Redondo Beach
R. C. Boughton, Los Angeles Gas & Elect. Corp., Los Angeles
J. E. C. Currens, Western States Gas & Elect. Co., Stockton
D. B. Larson, Portland Gas & Coke Co., Portland
Geo. Wehrle, Public Service Co. of Colo., Denver
R. V. Wilson, Pacific Gas & Electric Co., San Francisco
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Gas Main Construction

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Customers Service

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J. F. Murray, Southern California Gas Co., Redondo Beach, Cal.
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C. D. Weiss, San Diego Cons. Gas & Elect. Co.
E. G. Campbell, Pacific Gas & Electric So. San Francisco
F. B. Biddington, Southern California Gas Co., San Bernardino

Labor Saving Devices—Power Equipment
A. E. Strong, Coast Counties Gas & Electric Co., Santa Cruz

Field Construction Equipment Trenchers, Back Fillers and Tractors
J. E. Kelley, Western States Gas & Electric Co.

Lubrication—Carburation
H. W. Drake, Portland Gas & Coke Co., Portland

Cost of Operation and Accounting Methods
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F. A. Hamilton, Southern California Gas Co.
A. S. Hamilton, Southern Counties Gas Co., Los Angeles

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Eugene Boose, Southern California Gas Co., Glendale, Calif.

Symposium of Operation
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Oil Sprays: Don C. Murphy, Southern California Gas Co.; F. M. Cota, San Diego Cons. Gas & Electric Co.; Duncan Stewart, Pacific Gas & Electric Co.; H. J. Knollman, Los Angeles Gas & Electric Corp.

Automatic Controls: M. O. Jensen, Jensen Instrument Co.; J. M. Dickey, Pacific Gas & Electric Co.; F. M. Cota, San Diego Cons. Gas & Electric Co.; C. M. Cole, Southern California Gas Co.; A. W. Powell, Powers Heat Regulating Co.; F. J. Gartland, Public Service Co. of Colo., Denver

Soil Corrosion: H. S. Christopher, Southern California Gas Co.; Dozier Finley, Paraffine Companies, San Francisco; G. A. Barker, Johns Manville, Inc., San Francisco; R. W. Martindale, U. S. Cast Iron Pipe and Foundry Co., San Francisco; E. B. Hager, Eclipse Paint & Mfg. Co., San Francisco; S. H. Graf, Oregon Agricultural College, Corvallis, Ore.

Flow Formulae: R. C. Boughton, Los Angeles Gas & Electric Corp.; B. M. Laulhere, Midway Gas Co.; Ted Rosebaugh, Pacific Gas & Electric Co.; A. R. Fox, Western States Gas & Electric Co., Stockton.

Small Plant Operation: J. J. Ferrari, Puget Sound Power & Light Co., Bellingham; J. F. Sauer, Pacific Gas & Electric Co.; J. T. Sullivan, Truckee River Power Co., Reno

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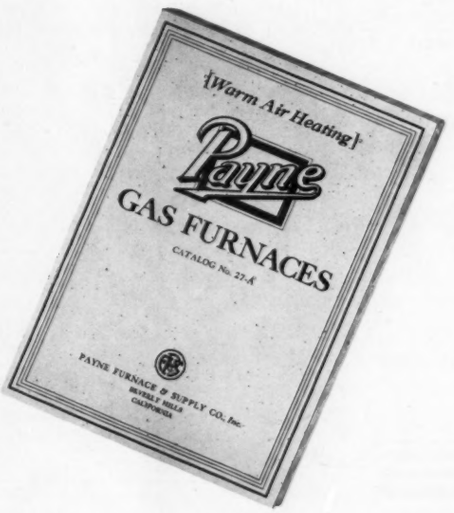

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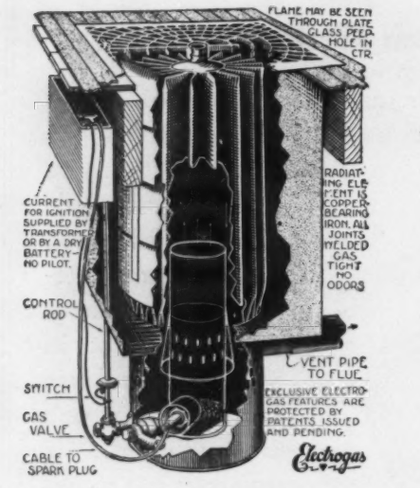
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NATURAL GAS GASOLINE OPERATIONS

Compiled by E. T. Knudsen
Department of Commerce, Bureau of Mines, Division of Mineral Resources and Statistics

ONE hundred and forty-nine natural-gas gasoline plants with a daily indicated capacity of 1,264,021 thousand cubic feet, report a recovery of 39,779,427 gallons of natural-gas gasoline from 28,046,547 thousand cubic feet of gas treated in December. This is an increase of 1,641 barrels in daily average production.

Utilization of natural-gas gasoline amounted to 909,261 barrels, an increase over November of 53,007 barrels. Daily average utilization of 29,331 barrels was 1,222 barrels less than daily average production of 30,553 barrels.

Stocks of natural-gas gasoline at the end of December amounted to 318,429 barrels, of which 33,749 barrels were reported by natural-gas gasoline plant operators and 284,680 barrels by refinery operators. This is an increase of 37,868 barrels over November stocks. This stock figure of 318,429 barrels is approximately eleven days' supply at the current rate of consumption.

Production of gasoline during the month of December amounted to 4,760,430 barrels, a daily average of 153,562 barrels. This is an increase of 421,165 barrels or 9.71 per cent over the November output and an increase of 1,044,092 barrels or 28.10 per cent over the output of December, 1925.

Of the gasoline produced 4,324 barrels were reported as finished gasoline produced by natural-gas gasoline plant operators. Production of gasoline from cracking processes increased in December to 492,936 barrels. Stocks of gasoline show an increase of 364,969 barrels during December and at the end of the mount amounted to 10,596,340 barrels. This stock figure includes 169 barrels of finished gasoline reported by natural-gas gasoline plant operators.

CALIFORNIA NATURAL-GAS GASOLINE PRODUCTION, DISTRIBUTION AND STOCKS

December, 1926

PRODUCTION

Type of Plant	*Gas Treated M. C. F.*	*Natural-gas Gasoline Produced Gallons*	*Gasoline Recovery per MCF Gas Treated*
Oil Obsorption	12,406.172	18,947,426	1.527 Gal.
Compressor	322,188	543,738	1.688 "
Combination Comp. and Oil Absorption	8,586,122	13,822,722	1.610 "
Combinat'n Oil and Charcoal Absorption	5,575,246	6,218,113	1.115 "
Charcoal Absorption	1,156,819	226,219	.196 "
Drip	.....	21,209	..... "
TOTALS	28,046,547	39,779,427	1.418 "
Finished Gasoline produced at plants			4,324 Bbls.

DISTRIBUTION

Stocks first of month	.....	Bbls.	280,561	Bbls.
Production during month	.....	"	947,129	"
Quantity mixed with crude or unfinished oils	335,389	"	.....	"
Used in blending at Refineries	474,180	"	.....	"
Stocks end of month	318,429	"	.....	"
Used at Plants, Shortage and Evaporation losses	13,980	"	.....	"
Balance	85,712	"	.....	"
TOTALS	1,227,690	Bbls.	1,227,690	Bbls.

STOCKS

Natural-gas gasoline held by Natural-gas Gasoline Plant Operators	1,417,447	Gal. or	33,749	Bbls.
Natural-gas gasoline held by Refiners	11,956,560	" "	284,680	"
TOTALS	13,374,007	Gal. or	318,429	Bbls.
Finished Gasoline (Motor Fuel) held by Natural-Gas Gasoline Plant Operators				169 Barrels

GIANT GASOLINE PLANT

One of the largest natural gasoline plants in the world is that of the Sinclair Oil & Gas Company at Covington, Okla., which can handle about 40,000,000 cu. ft. of gas daily, with a recovery capacity of 80,000 gallons a day. This capacity may be raised to 100,000 gallons in 1927.

STANDARD EMPLOYEES HAVE EDUCATIONAL OPPORTUNITY

Employees of the Standard Gasoline Company, formerly Pacific Gasoline Company, and now a part of the Standard Oil Company of California organization, have just been offered participation in the educational department courses offered by the Standard. Fifteen courses on various phases of petroleum and gasoline work, as well as a number of general business training courses, are available.

COLUMBIA GASOLINE CORP. HAS GASOLINE PLANTS

The Columbian Gasoline Corporation of Monroe, La., on January 1, began marketing natural gasoline and U. S. Motor gasoline. The corporation has taken over the gasoline plants formerly operated by the Southern Carbon Company. The corporation will operate 10 natural gas gasoline plants, which are located in Louisiana, Texas and Kansas. It owns and operates 125 insulated tank cars.

KAY COUNTY HAS 14 PLANTS

Natural gasoline extraction is coming into prominence in Kay County, Okla., where 14 plants have been located, four in the Tonkawa field, one in the Hubbard, three in the Otstot, two in the old Blackwell field, one in the Vernon pool and two in the Braman district.

ARKANSAS COMPANY FINISHES COMPRESSOR STATION

Arkansas Natural Gas Company, which operates a 16-inch natural gas line from Caddo Parish to Little Rock, Ark., has completed a new compressor station at Emmet. The station has four 400 horsepower gas engine driven compressor units, and is a further assurance to Little Rock and other points on the line of adequate gas pressure at all times.

PORTLAND GENERATOR BUILDING TO BE COMPLETE IN APRIL

Good progress is being made on the new reinforced concrete building for housing four twenty-seven foot diameter straight shot oil gas generators at the Portland Gas and Coke Company's plant. The first of these units is to be installed in 1927. The new building is completed up to the operating floor and the steel columns and roof trusses are being erected. The contract calls for completion in April.

GAS CO. OF HANNIBAL, MO., CHANGES HANDS

E. C. Beach and associates, Chicago, have bought the Citizens Gas Co. of Hannibal, Mo., from W. E. Moss & Company of Detroit. E. D. V. Dickey remains as local manager of the Hannibal utility.

CONGRESS ASKED FOR FUNDS TO PIPE HELIUM

Congress is asked by the helium division of the Bureau of Mines to appropriate $600,000 for construction of a 25-mile pipe line from the Nacona gas field to the Government's helium plant at Fort Worth, Texas.

DRAMATIC CLUB OFFICERS FOR SAN DIEGO COMPANY

San Diego Consolidated Gas & Electric Company has a dramatic club, newly formed. Officers are: Forrest Raymond, president; J. A. Harritt, vice-president; Ruth E. Creveling, secretary; Lee J. Thompson, treasurer.

DENTIST AND OPTOMETRIST FOR EMPLOYEES' ASSN.

The board of directors of the Los Angeles Gas & Electric Corporation's Employees' Association has arranged for some special medical attention for members. Membership cards now entitle holders to guaranteed work on teeth and eyes at materially reduced prices, a dentist and optometrist having been secured by the association. Dependent members of association members' families are also entitled to share in the plan.

F. R. BAIN GIVES 15TH ANNUAL COMPANY DINNER

F. R. Pain, president of the Southern Counties Gas Company, Los Angeles, on January 14 gave his fifteenth annual dinner to more than one hundred officers, directors and employees of the company, the banquet being held at the Biltmore Hotel, Los Angeles.

HOUSTON OIL CO. MAY BRING GAS TO ALICE, TEXAS

Engineers of the Houston Oil Company, which has a gas line about 18 miles west of Alice, Tex., are reported by the Alice Chamber of Commerce to be about to conduct a survey in that community, to determine whether the company will extend gas service to Alice.

PAINTS FOR EVERY PURPOSE

For a quarter of a century Hill, Hubbell & Company have developed special paints and coatings to meet unusual conditions in many industries. If you are perpexed with the problems of protecting your plant and equipment or products, submit them to our Research Department. They will welcome the opportunity to develop the proper paint for the purpose.

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It renders joints not only leakproof, but easy to take apart if desired.

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GAS COMPANY BENZOL FUEL IS INCREASINGLY POPULAR

The Portland Gas & Coke Company has signed a contract for all if its surplus benzol not required to fill local demands for motor fuel and for the rubber and paint industries on the Coast.

With the probability of high compression automobile engines being placed on the market now that Ethyl Gasoline is universally obtainable in the United States and Canada, the demand for benzol motor fuel will be still greater.

Benzol motor fuel has all the advantages of Ethyl Gasoline as regards non-detonation and in addition has easier starting properties, greater mileage per gallon and less tendency to dilute crankcase oil. It can be used in high compression engines; in fact a blend of 40 per cent benzol and 60 per cent gasoline is used as a standard by the manufacturers of Ethyl Gasoline in determining the amount of ethyl fluid to be added.

H. J. KNOLLMAN GOES WITH BOOTH ENGINEERING CO.

H. J. Knollman, formerly ceramic engineer for the Los Angeles Gas & Electric Corporation, has left that utility to join the organization of the Booth Engineering Company, of Los Angeles. The Booth company is sales agent for the American Refractories Company and the Alloy Steel & Metals Company, as well as for manufacturers of other products such as recuperators, drying equipment and humidity drying systems.

Mr. Knollman will be engaged in sales work on high temperature cements, plastic refractories and other furnace and heat materials, and also corrosion resisting and high temperature steels.

COAST COUNTIES LINE FROM SANTA CRUZ TO WATSONVILLE

The Coast Counties Gas & Electric Company, with headquarters in San Francisco, Calif., will begin construction in June of a six-inch gas transmission line extending from Santa Cruz to Watsonville. It will be twenty miles in length and will involve an expenditure of approximately $135,000.

The rapidly developing territory around Watsonville calls for building the new line, according to A. E. Hall, gas engineer of the Coast Counties Company. The gas sales in Watsonville in 1926 show a 20 per cent increase over the 1925 sales.

The line will extend along the county highway and will serve the intervening territory between Santa Cruz and Watsonville. It will be completed by October to take care of the winter peak load.

HOUSE MICE ATTACK IS NEWEST GAS COMPANY PROBLEM

During the attack of house mice in the vicinity of Taft, Calif., the Midway Gas Company's camp at Compressor Station A was the scene of great carnage. The daily kill at times amounted to between fifteen and twenty thousand mice. In one small granary over fifty thousand mice were killed by a crew of forty men in four hours. Hundreds of tons of poisoned grain were used in the vicinity of Taft in curbing the invasion.

FREAK WELL SPOUTS FROZEN OIL AND GAS

A temperature of 176 degrees below zero was registered by the discharge from the Continental Oil Company's McCallum Dome gasser, in Jackson county, northwestern Colorado. Oil and gas issued from the well in the form of frost and snow, say reports.

SHELL COMPANY BUILDING LINE FOR VENTURA GASOLINE

To connect the Ventura gasoline plant of the Shell Company with the company's refinery at Watson, a 4-inch gasoline line 98 miles long, is now under way. Natural gasoline will be transported on a large scale, the line having a capacity of 150,000 gallons a day.

Cummings Welding Works of Long Beach is laying the south end of the line, and Hulihan & Chestnut the north end. Slip-joint pipe is used and the line is to be of all-welded construction. The slip-joint pipe is somewhat of a new departure in this use. The pipe selected has the advantage of being light weight and of excellent quality steel. Pumping will be done by motor-driven centrifugal pumps, especially designed and built for the purpose by a California manufacturer.

Leaving the Ventura Avenue field the gasoline line follows the most direct route to the Santa Susanna Pass, and after crossing the pass, straightens out to follow a direct route over the Santa Monica mountains six miles west of Laurel Canyon. Thence the line crosses the Los Angeles Basin to the Inglewood Oil Field near Culver City, and from there to Watson, where the Shell refinery is located.

SINCLAIR GASOLINE PLANT IN SEMINOLE FIELD COMPLETE

Sinclair Oil & Gas Co. will complete its natural gasoline plant in the Seminole field, Oklahoma, and have it in complete operation within two weeks. Part of the plant is now running. The plant, absorption type, is expected to produce around 60,000 gallons of gasoline per day. Twelve 170-horsepower Cooper compressors will handle the gas for the plant. Distillation will be handled through two type I Braun units and Braun coolers will be used. Two Newton absorbers are being erected.

NEW DISTRICT SUPERVISOR FOR STANDARD GASOLINE

G. Elmo Fuller, who has served as a testing engineer in the southern division of the Standard Gasoline Company, which has headquarters at Los Angeles, has been elevated to the position of district supervisor in charge of Brea, Montebello, Santa Fe Springs, Murphy-Coyote and Kramer gasoline plants.

BROWN TO REPORT AT MEETING OF GASOLINE MFGRS. ASSN.

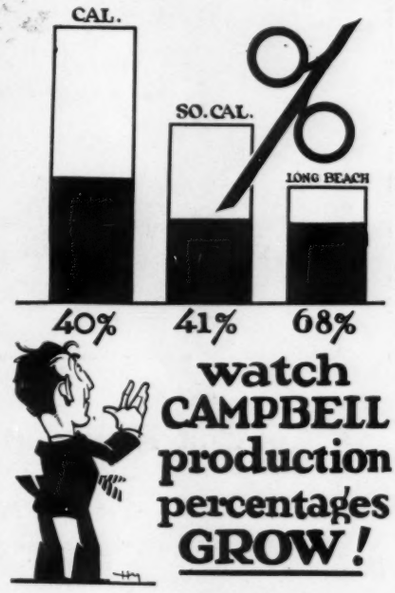
At the three-day sessions of the Association of Natural Gasoline Manufacturers, scheduled for April 19-21 at Tulsa, Dr. G. G. Brown of the University of Michigan, who is directing the Association's research program, will offer a report which is to be the feature of the convention.

GAS LOSS SURVEY IN PANHANDLE

B. C. Clardy, state deputy oil and gas supervisor for Texas, and E. F. Humes, head of the state utilities division, were in January conducting a survey of gas waste in the Texas Panhandle. A conference of operators was expected to be called at the conclusion of the survey. A survey made in December revealed a daily loss of about 246,000,000 cubic feet of casinghead gas.

CONSTRUCT GASOLINE PLANT IN SEMINOLE FIELDS

A 7,500 gallon gasoline plant is being built by the Doherty company's gasoline division on the Empire-Wilson lease in the southwest part of the Seminole oil and gas field, Oklahoma.



Watch Campbell Production Percentages Grow!

Phenomenal indeed has been the production record of Campbell Oil-Froth Absorbers. Already 40% of the entire production of natural gasoline in California comes from these Absorbers. In Southern California, 41%; in the Long Beach field, 68%. Recent orders now in process of completion will increase these percentages.

With plans now being perfected for the distribution of our Absorbers in the Mid-Continent and elsewhere this record of success will be increased.

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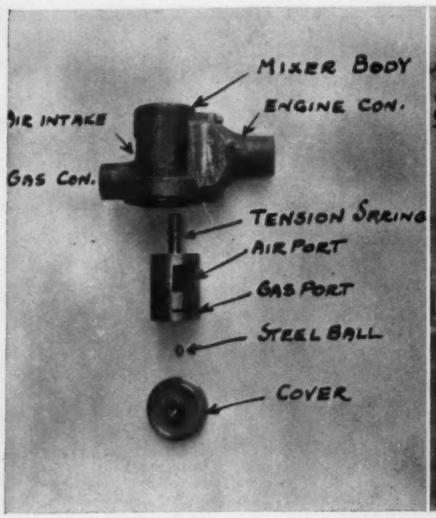


Figure 1

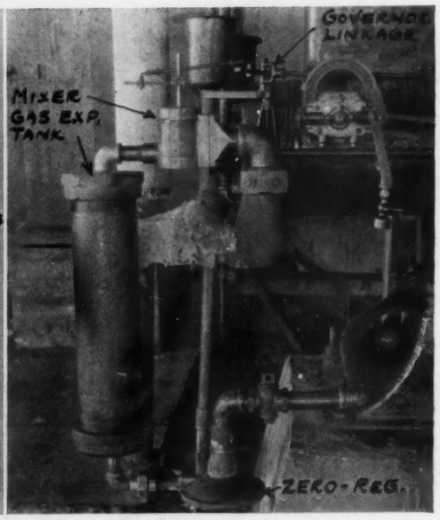


Figure 2

Constant Ratio Gas Mixer *for* Gas Engines

By L. C. HAFFNER
Portland Gas & Coke Company

MOST modern gas engines are equipped with mixing devices maintaining a constant ratio between the gas and air supply, disregarding speed and the load the engine is carrying.

In converting engines from liquid fuel to gas, special devices must be used to maintain correct mixture ratios.

This problem was solved for a 10 h. p. engine by the device shown in Fig. 1. The air intake and the gas port were cast into a brass cylinder, representing the correct ratio between gas and air. A stem is attached to this body so as to allow attachment of a controlling lever. This cylinder fits into a brass body having an opening for the air intake, gas connection, and also an adapter for connection to the engine. The cylinder rides on a steel ball which is carried by a cover plate. The rod attached to the brass cylinder is connected to the governor linkage such as is found on the liquid fuel engine. To adjust the governor linkage, the engine is brought to speed carrying its rated load. The proper setting for the brass cylinder is found and the governor linkage is locked in place at this position. It was found by experimentation that the calculated area of the gas port was too large, which was ascribed to the gas being fed on the 4-inch pressure mixing device. To overcome this difficulty, a so-called zero regulator was installed, which is a governor releasing gas at nearly atmospheric pressure. To feed gas at atmospheric pressure to the mixer, a gas expansion tank was also installed which was made of capped 6-inch pipe as the illustration (Fig 2) shows.

This arrangement creates a reservoir from which gas is drawn at the intake stroke of the engine and no great fluctuation of gas pressure can occur with this device.

STEERE ENG. CO. AND SEMET-SOLVAY IN CONSOLIDATION

A new company, the Semet-Solvay Engineering Corporation, a division of Allied Chemical and Dye Corporation, has been formed by the consolidation of the Steere Engineering Company of Detroit and the engineering and construction departments of Semet-Solvay Company, New York. The new corporation has headquarters at 40 Rector Street, New York. Frank W. Steere is vice-president of the Semet-Solvay Engineering Corporation.

The Steere Engineering Company has established a national reputation as designer and builder of gas plants and equipment, while the Semet-Solvay Company specialized in design and construction of by-product coke ovens. The present organization resulting from the consolidation will offer these combined services on a more extensive scale than ever before.

JORDAN GENERAL MANAGER OF WESTERN OKLAHOMA COMPANY

Joe Jordan has been appointed general manager of the Western Counties Gas Company, serving several communities of Western Oklahoma. His offices will be at Cordell. J. H. Shoyer, construction foreman, will have headquarters at Hobart.

A. G. A. APPROVAL REQUIREMENTS CONSIDERED IN PORTLAND

The House Heating Section of the Gas Appliance Dealers Association of Portland, in addition to its personal efforts, has had two meetings devoted entirely to the consideration of the proposed Approval Requirements for Centrally Gas-Fired House Heating Appliances and for Gas Water Heaters.

Their observations and recommendations will be submitted to the Pacific Coast Gas Association's Appliance Information Committee, for transmittal to the Chairman of the National Committee.

MIDWAY STATION R AT WORK

The new addition to the Midway Gas Company's Station R, in the Ventura field, Calif., is now in full operation. The entire plant, together with this addition, is now delivering approximately thirty million cubic feet of gas a day.

LAFAYETTE, LA. PLANT BEGINS GAS MANUFACTURE

Manufacture of gas has begun at the new plant of the Louisiana Public Utilities Company, Inc., recently completed at Lafayette, La.

PROMINENT OAKLAND APPLIANCE DEALER DIES

The evening of December 23d, 1926 saw the passing of Herman S. Harrison, one of the pioneer gas appliance dealers of Oakland. Mr. Harrison was seriously injured on December 21st when the machine which he was driving collided with the Southern Pacific ferry train, a short distance from his place of business, 19th and Market Streets, Oakland.

Mr. Harrison's death is a decided loss to the gas fraternity as a whole, as he was always active in all lines of endeavor which pertained to the general welfare of the industry. He had been in the gas appliance business for over 15 years. Until the day of his death, he was actively engaged as manager and proprietor of the Pacific Gas Appliance Company, located at 19th and Market streets, Oakland. Here he manufactured and distributed the Harrison line of gas basement and floor furnaces. He was also the Hoffman water heater representative for Alameda County, having held that agency ever since its establishment in this territory. He was active in the work of the Pacific Coast Gas Association, a director of the Gas Appliance Society, and a member of many Masonic and civic organizations in the city in which he lived.

He is survived by his widow, Mrs. H. S. Harrison, and by a father and mother, now residing in the East. Mrs. Harrison, who has been actively associated with Mr. Harrison in the business, is well fitted to carry on. She is a member of a number of women's organizations and holds the position of a director of the Gas Appliance Society, the only woman in such an office in the state. Her concern plans to continue the manufacture of furnaces and distribution of water heaters.

PERSONNEL CHANGES FOR SO. CALIFORNIA GAS COMPANY

A number of personnel changes were made effective in the Southern California Gas Company organization in January:

C. S. Pool, superintendent of compressor stations, Northern Division, has resigned to accept the position of general superintendent for the new Ventura Fuel Company. A. B. Newby, superintendent of compressor stations, Southern Division, has been transferred to the same post in the Northern Division. S. S. Donaldson, office engineer, Southern Division, has been appointed superintendent of compressor stations in that division. J. P. Ziegler, of the measurement department, has been transferred to the Distribution Building at Tenth and Santa Fe, to fill the vacancy created by Mr. Donaldson's transfer. H. L. Graham, foreman of the maintenance department at Taft, has been appointed superintendent of that department. This vacancy was created by the death of R. J. Haskell.

ROAD BINDER SALES ARE NO PROBLEM IN OREGON

Macadam roads surfaced in 1926 with Gasco Road Binder, a tar product of the Portland Gas and Coke Company, have shown such excellent results that a contract for more than 70 per cent of the 1927 output is being entered into with the Oregon State Highway Commission. The remainder will be readily absorbed by the county and city road department.

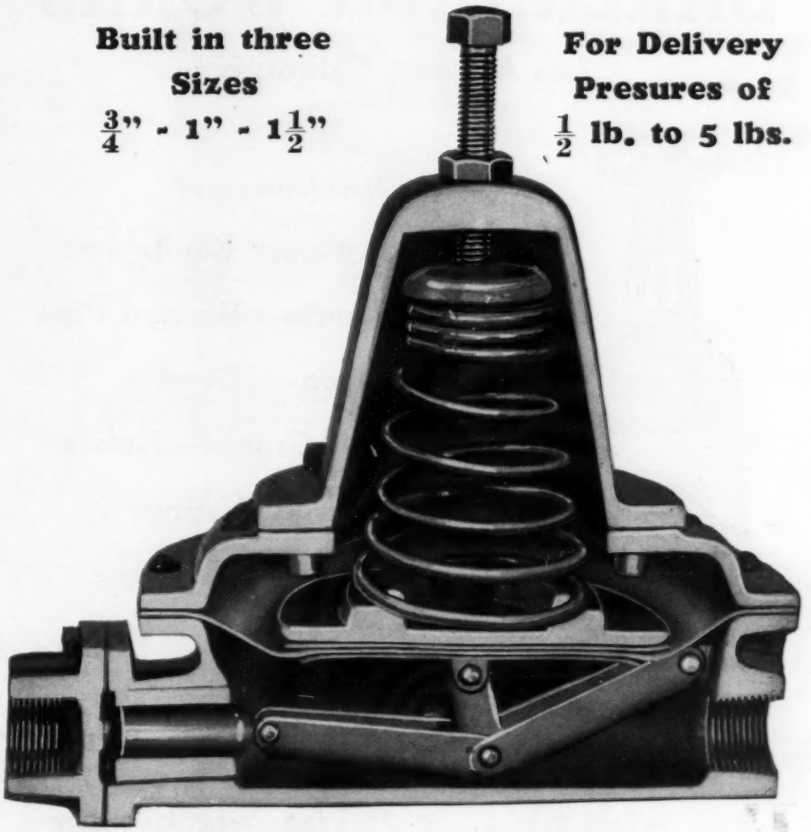
SAN JOSE GAS APPLIANCE MEN MEET IN JANUARY

With an attendance of more than 50, the San Jose unit of the Gas Appliance Society of California held a dinner on January 13 at which John R. C. Ross, sales manager for the San Jose division of the Pacific Gas & Electric Co., spoke on 1927 sales expansion.

The Reliance High Pressure Regulator

Built in three Sizes
$\frac{3}{4}$" - 1" - 1$\frac{1}{2}$"

For Delivery Presures of
$\frac{1}{2}$ lb. to 5 lbs.



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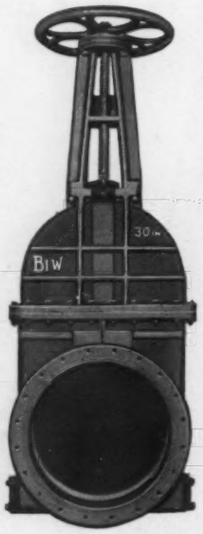

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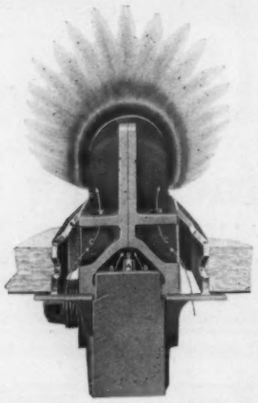

The gas burner with a snappy, high temperature flame

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The Beacon Automatic Storage Water Heater

Has a Brass Heating Element With Six Times the Heat Conductivity of Iron

The Beacon is a heavy duty appliance—high grade materials throughout. The boiler is made of heavy gauge galvanized iron and all seams are both riveted and welded.

In addition to the heart of BRASS the Beacon has a rust-proof BRASS circulating pipe which keeps the water clean.

Beacon Water Heater Co.

Geo. F. Pearse

776 So. San Pedro St. Los Angeles, California

Gas Appliance Men Meet *in* Interests *of* Sales Drive

IN the particular interest of its annual Spring Campaign the Gas Appliance Society of California met in its yearly spring convention banquet, on the evening of Wednesday, January 26.

The speaking program of the banquet meeting included an address by George Glans, president of the Society, who summarized the business transacted at the afternoon session of the organization's advisory board. F. U. Naylor, secretary of the Gas Appliance Society, followed Mr. Glans, with an outline of the program for the 1927 Spring Campaign. Neal Johnson of the Hoover Company spoke on "Selling Household Appliances," and the subject "Merchandising for a Profit," was handled capably by Dr. Alfred P. Haake, assistant to the president, Simmons Company.

Spring Campaign plans are being whipped into form and a preliminary bulletin will soon be issued outlining the program in detail for the benefit of dealers and newspapers. An invitation has been extended to the Southern California Gas Appliance Association to participate in this year's campaign, and if the two organizations cooperate the campaign will have a state-wide flavor which should mean much desirable sales stimulus for gas appliance sales.

FEATURES OF 1927 SALES DRIVE

F. U. Naylor has outlined for *Western Gas* some of the features of the 1827 sales campaign, dates for which are set for April 24 to 30:

1. A quota of 100,000 column inches of newspaper advertising and publicity. (In 1926 the campaign total was 87,000 column inches.)
2. A contest for stimulating reader interest around the best dinner menu for four people, costing not to exceed $2.00, and including recipes for the cooking of the foods. A special folder regarding this will be printed and generally distributed. Details of prizes to be outlined and suggested for local units.
3. The main feature of the campaign will be special cash allowance on ranges costing above a certain amount, that are equipped with oven temperature controls. Tentative plans are for a $10.00 cash allowance on such ranges. The motive of this allowance is to constructively build sales.
4. Plans will be suggested to local units regarding general contact and tie-in with service clubs and other organizations.
5. A special new poster for the campaign week will be prepared and distributed.
6. Talks for radio broadcasting will be prepared and arranged for.
7. Suggestions on special dealer displays, window trims, and demonstrations will be outlined.
8. Suggestions for local unit awarding of prizes for best window trims is planned.
9. A free service will be continued of supplying mats on various illustrations for the use of newspapers and dealers in making up publicity and advertising.

In general, local units are urged to plan now for the execution of the campaign in their territory, by appointing a special local campaign committee.

A. L. Crane is being retained again as general campaign director, his address being New Montgomery Street, San Francisco, California.

OKLAHOMA CITY METERS GAIN

Increase of 2587 gas meters in 1926 is reported for the Oklahoma Gas & Electric Company, this increase including Oklahoma City, Britton, and Bethany.

LAY LINES AT TONKAWA, OKLA.

Laying of 4,000 feet of six-inch main, replacing smaller lines in the north part of Tonkawa, Okla., has recently been completed by the Oklahoma Northern Utilities Company.

TONS OF TURKEYS FOR GAS MEN

Thirteen tons of turkeys formed the Christmas gift of the Los Angeles Gas & Electric Corp. management to more than 2600 employees of the company whose service period made them eligible.

GAS FOR HAVRE, MONTANA

Havre, Montana was scheduled to have natural gas service by January 10, following the completion on January 1 of a 23-mile pipeline from the Bowes structure in Blaine county. Hardrock Oil Company brings the gas to the Montana Gas Corporation for distribution in Havre.

COAST COUNTIES PLANS 1927 EXTENSIONS

Coast Counties Gas & Electric Company, which has headquarters at San Francisco, plans a $50,000 expenditure for its Contra Costa territory, $20,000 of this sum being for general extension of services, and about $43,000 going to build a garage, shop and compressor station for Pinole, to which service is being extended. Some additions are also to be made to the Pittsburgh plant of the company.

KALISPELL, MONT., MAY HAVE GAS FROM COAL RETORT

The Somers Coal and Mining Company, with mines at Paola, Mont., early in January was reported to be about to establish a coal retort plant of 30-ton capacity in Kalispell, the plant to produce sufficient gas to supply the community for domestic purposes.

FREDERICK, OKLA., NATURAL GAS DISTRIBUTION BEGINS

Gas was turned into the mains in Frederick, Okla., late in December, following the completion of the distribution plant by the Community Natural Gas Company. The distribution company buys its gas from the Lone Star Gas Company of Dallas, Tex. C. C. Moore is local manager in Frederick.

SEAL BEACH PLANT TO START OPERATION ON FEBRUARY 7

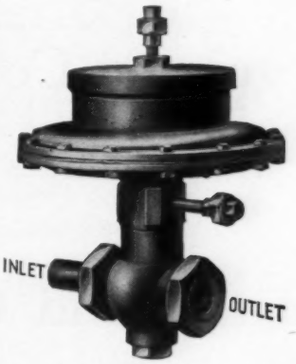
Standard Gasoline Company will begin operation of its gasoline plant in the Seal Beach field, Southern California, on February 7.

BROCK TO LEAVE BARTLESVILLE

Clifford E. Brock, superintendent of production for the natural gas division of the Empire Company, at Bartlesville, Okla., is leaving that company to become manager of the Kay County Gas Company, Ponca City, Okla.

INSTALL ORIFICE METERS TO GET DISTRIBUION DATA

Installation of orifice meters to measure the output to the major divisions of its high pressure systems has just been completed by the Portland Gas & Coke Company. Six meters have been put in operation, three of these being located on the main lines leading from the pumping station and the balance at strategic points along the larger distribution mains. The data secured from these meters will serve principally for the planning of future additions to the system and will also be utilized by the Load Factors Committee of the Pacific Coast Gas Association.



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Manufacturers
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PABCO PRODUCT
TO PROTECT
EVERY SURFACE

The Paraffine Companies, Inc.

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BOOK ON GAS MANUFACTURE BY J. J. MORGAN

THOSE who have been looking for a thorough and modern treatise on the art of gas manufacture will be glad to know that Jerome J. Morgan, Associate Professor of Chemical Engineering at Columbia University, has just published Volume 1 of "Manufactured Gas." The work contains 500 pages, is very well illustrated, and is divided into twenty-four chapters, taking up such subjects as the physical characteristics and composition of gases, gas making apparatus, the carbonization of coal, gas works refractories, boiler plants, blue gas, condensing and scrubbing, purification, and gas plant design. Chapter 16 is devoted to Pacific Coast oil gas.

In the preparation of the book Prof. Morgan has had the assistance of the American Gas Association and of a number of well known engineers including W. S. Yard of the Pacific Gas & Electric Company and President of the Pacific Coast Gas Association.

Volume II is now being prepared and should be ready by the end of the year. It will deal with distribution, utilization, and business aspects of the gas industry. Prof. Morgan is both publisher and author. The price of Volume I is $7.50, cloth bound.

NOW DOHERTY FISCAL AGENT

R. J. Grover, former manager of the Winfield, Kan., Gas Company, is now fiscal agent for the Doherty companies for the Winfield territory, handling Empire, Cities Service and related securities for the Doherty interests.

J. A. CAMPBELL HAS TAFT BRANCH

J. A. Campbell, Long Beach, Calif. manufacturer of the Campbell Oil Froth absorber, has established a branch office at Taft, Calif., to handle Northern California business. Sid W. Sims is in charge of the Taft branch.

STOCK ISSUE PERMIT GIVEN ARIZONA UTILITY

The state corporation commission of Arizona has authorized the Peoples Arizona Gas and Electric Company to issue and sell 3,000 shares of its capital stock at $100 a share, and to issue $500,000 in first mortgage gold bonds, bearing interest at 5½ per cent.

CARLSBAD, N. M. MAY HAVE GAS FROM NEAR OIL FIELD

Piping of gas to Carlsbad, N. M., from oil fields 20 miles northeast of the city, is said to be regarded as a feasible project by engineers who have inspected the field recently.

PACIFIC SERVICE EMPLOYEES ASSN. ELECTS OFFICERS

New officers for the Pacific Service Employees Association have been elected, as follows: Chairman, H. W. Beekman; vice-chairman, J. M. Williams; secretary, Thera Hamilton; treasurer, J. C. Carmody.

10 GALLONS PER M. C. F. MADE ON GAS FROM MARLAND WELL

Tests on gas from the Marland well on the Garber farm near Garber, Okla., made 10 gallons of gasoline per thousand cubic feet.

CADDO MILLS HAS GAS

Caddo Mills, Tex., has been tied into the system of the Community Natural Gas Company, something more than 100 consumers having been added.

Texas Panhandle Gas

(Continued from Page 19)

the major companies is selling part of its gas to be burned for carbon black, but the outlet for this purpose is very limited, and only a small quantity of the available gas can be used for carbon black. This condition is quite contrary to California where there is no surplus gas, except from flush production, or in the summer. Gas can not be burned for carbon black in the west due to the price the gas commands. A plant can not be built to burn the surplus during flush production when millions of feet are going to waste, for the profit in the carbon black industry is very small with gas at two to three cents per thousand. The channel plants are anything but portable. They can be moved however, but the cost of doing so is very high. The other factor is the smoke from the burning houses, which is objectionable around cities.

The wells in the Panhandle are drilled on a so-called gentlemen's agreement of one well to ten acres, which makes them 660 feet apart each way. The result is long collecting lines for the gas. The field has been fairly well drilled in Block Y in Hutchinson county, which is south of the Canadian River. There is where the bulk of the casinghead gasoline is produced.

There seems to be only one of the major companies which still sticks to the idea of building the older permanent type of plant. That is the Phillips Company, which has built all large plants, collecting gas from long distances. In this way operating costs may be reduced somewhat, but the company will more than lose this saving unless the field be of a long life, due to the time required to build the plants. The Texas and Oklahoma fields have had more than one of the permanent type plants without sufficient gas to operate them successfully when completed, due to this factor of time required for their construction. The flush production very often means the success or failure of a plant from a dollars and cents standpoint.

A BAD PRECEDENT

While the Phillips Company has gone on building large plants they found it necessary to start a new evil in the gasoline industry. When they found themselves unable to build plants fast enough to take the gas they had under lease and wanted to lease, they started to lease gas and pay for it regardless of whether they treated it or not, the idea being to keep the other companies out who were financially unable to do the same thing. They pay for the gas as soon as the wells come in, which is even better than one can do with a portable plant, but this practice has established an extremely bad and harmful precedent. Once such an evil is started there is no stopping it. It is like paying a high royalty in a field to one producer, then trying later to get other gas in the same field at a much lower rate. It simply isn't done without causing trouble. This one development will probably be regretted in the future as an unnecessary step to avoid competition from others.

While the Phillips people have been building along the line of permanent plants of large capacities, the other companies have installed portable plants. They will be found in large numbers scattered throughout the Panhandle. Both oil and charcoal portables are there, but the charcoal plants are few in number compared with the oil plants; they are all treating rich gas.

The charcoal plant seems to make a very good extraction on Mid-Continent wet gas. The charcoal is cooled very little in comparison to the cooling noted when treating

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Permanent Pipe Line Protection

PIONEER Rubbertex come as the solution to the pipe line protection problem giving complete protection to buried or exposed surfaces under any conceivable condition.

It forms a solid, impenetrable, yet flexible coating which retains its flexibility even when frozen. It will not chip or scale away from pipe even when bent at right angles.

In tests it has withstood galvanic action when submerged in salt water, demonstrating itself to be not only a perfect permanent pipe protection but a perfect insulating coat as well.

We'd like to have our engineers discuss your pipe covering problems with you . . . at no obligation to you.

TRY THIS TEST

Heat some Pioneer Rubbertex to a liquid consistency and flow it onto a piece of sheet metal or pipe. Place the pipe or metal on ice and freeze it as long as you wish. While both metal and Rubbertex are at this extremely low temperature you can bend the metal or twist it. The Rubbertex will not crack or chip off.

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The STRICKLER Ratchet Pipe Cutter automatically cuts cast iron, steel and wrought iron pipe (from 1½ to 30" in diameter) by hand (either in the trench or in the shop).

You can cut any pipe from any position easily. Simply pump the handle and the STRICKLER does the rest. Order your STRICKLER Now

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dry gas. That point does not seem to matter greatly in the Mid-Continent but is a vital factor in California. The writer has accurate test data on two charcoal plants in California which tried to treat wet gas and could not get the tail gas content to under .40 gallons per thousand. The lack of gas to cool the charcoal seems to be the difficulty in California.

Recently the charcoal plants in the Panhandle have been having trouble with screens and oil. The screen trouble will be and is being solved now. Fine mesh alloy screen has been abandoned for punched plates spaced one above the other. The distance between them is approximately one-sixteenth of an inch. The plates are staggered so one hole does not come over the other. The wet gas passes up through the bottom hole to the upper plate, then through the space between the plates and out the upper hole. The gas passage through the plates is the number of holes in the plate times the distance between the plates times the circumference of one hole.

OIL PROBLEM TROUBLESOME

The oil problem in the gas does not seem so easy to overcome. The oil vapor in the gas is impossible to remove with any of the present mist extractors but must be taken out before the gas reaches the charcoal or the activity of the charcoal is destroyed. In virtually all cases the activity can be restored, but in one case it could not be brought back enough to make the charcoal usable.

The portable oil absorption plants are used in two sizes in the Panhandle. One plant, which is strictly portable, has a rated capacity of 2000-3000 gallons per day, but an actual capacity in the mid-continent considerably in excess of the above figure. Another semi-portable plant is now being used with a rated capacity of 7500 gallons per day. It has likewise an actual capacity much greater than the rating.

The Mid-Continent operators do not all seem to be entirely sold on the idea of the portable or semi-portable plants as permanent units. Most all of them are agreed that the portable plant is absolutely necessary to get the flush production, but some are of the opinion they should later be replaced with the so-called permanent plant. The reason is not quite clear to the writer, for the cost of the permanent and semi-permanent plants is less than that of the older type built on the site. The cost of operation is no greater and the equipment is the same but the arrangement is different. The factory-made plants will be the only ones used in a few years, in the writer's opinion. They have everything in their favor and especially in the Panhandle where the plants may not all pay out if the water situation gets much worse. The salvage value of a portable plant and semi-portable plant is virtually one hundred per cent.

The gasoline man should spend just as little money for labor of building a plant on the site as possible, for it can not be recovered when the plant is moved. An example in point is that of a coil pit. Most of the cost goes for labor in building the concrete basin and pipe fitting. The money so spent can not be recovered when the unit is moved, but more must be spent to dismantle the coils and wreck the pit. If small tube coolers and condensers had been used the units could have been moved with little loss and the cooling towers could likewise have been moved very easily. Money spent for labor to erect and build equipment which requires additional labor to dismantle and re-erect when the plant is moved should be kept at a minimum.

The outlook for the gasoline companies in the Panhandle field south of the Canadian

River is not too good in some cases, particularly due to water conditions, and in some cases due to the dilution of the wet gas with the high pressure dry gas. The conditions north of the river are much better at the present time. Water has not shown up in those wells and may not for a long time, if the knowledge gained from the present wells is used to the best advantage.

FINAL FIGURES FOR OUTPUT OF NATURAL GASOLINE

The production of raw natural-gas gasoline in the United States in 1925 amounted to 1,127,470,000 gallons, according to final figures prepared by G. R. Hopkins, associate petroleum economist, Bureau of Mines, Department of Commerce. This represents an increase of 193,609,000 gallons or 21 per cent over the output in 1924. The 1925 preliminary estimate of the Bureau of Mines was 1,104,900,000 gallons, the difference being due to the fact that small plants not reached by the monthly inquiries are included in the annual canvass. All the States, with the exception of Louisiana and those in the Appalachian area—that is, New York, Ohio, Pennsylvania, and West Virginia, increased their output over 1924. Declines in the supply of gas were responsible for the decreased production in the States named. In the Appalachian States the decline was natural, whereas in Louisiana, it was artificial through State regulation. Oklahoma retained her rank as the chief natural-gas gasoline producing State by virtue of a 30 per cent gain in output. California, ranking next in importance, also registered a 30 per cent gain.

FILL OFFICES IN SO. CAL. AND MIDWAY COMPANIES

C. L. Whitehill, formerly assistant secretary for the Southern California and Midway Gas Companies, has been named secretary on the resignation of L. M. Farnham. Mr. Farnham was vice-president and secretary of the two companies. His place on the directorate of the Southern California Gas Company is taken by T. J. Reynolds, and Gerald C. Young fills his vacancy on the Midway directorate.

DEATH CALLS PIONEER GAS MAN OF SAN DIEGO

Dr. R. M. Powers, one of the organizers of the first successful gas company in San Diego, Calif., and an early member of the Pacific Coast Gas Association, died at his San Diego home at the age of 81 on January 14. He was elected to honorary membership in the P.C.G.A. in 1912. With others, he organized the San Diego Gas Company and built a $30,000 plant in that city, in 1881.

WILL REPLACE 6-IN. LINE WITH 10-INCH

Plans to replace the six-inch line of the Southwestern Light and Power Company leading to Duncan, Okla., from the field north of Rush Springs, with 10-inch pipe are under way, according to L. K. McGee, manager of the Duncan office of the utility. Duncan, Comanche and Marlow were recently without gas for several hours as a result of a line break, and the larger mains will forestall another occurrence of this sort it is felt.

GAS FOR OKLAHOMA TOWNS

McAlester and Quinton, Oklahoma communities, are to have natural gas for domestic use, supplied by the Quinton Relief Oil & Gas Company from a 40,000,000 cubic feet well recently completed in Pittsburgh county, on the Bascom farm.

Corrosion, the destructive and costly enemy of your pipe lines, is effectively balked by the thick protective coating made by one application of Eclipse Save-A-Line to the pipe surface.

This extra thick film ,reinforced with asbestos fibre, elastic and enduring, protects for many years against the corrosive action of soils caused by moisture, lime, alkali or electrolysis. The life of thousands of miles of pipe line has been extended by the protecting film of Save-A-Line.

It can be applied without heating and by inexperienced labor. Only one application necessary.

Let us know your requirements. We will be glad to send you sample and quote you prices. If you have any particular difficulties peculiar to your soil or climate, our Service Department is at your disposal.

A Few of the Larger Users of Save-A-Line

The Shell Company
Lone Star Gas Company
Humble Pipe Line Company
The Gulf Pipe Line Company
Associated Pipe Line Company
California Petroleum Co.

The Eclipse Paint & Mfg. Co.

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A WESTERN GUIDE to INDUSTRIAL PURCHASING

Readers interested in any articles not listed in these pages are cordially invited to advise *Western Gas* of their wants and every effort will be made to furnish a list of the proper manufacturers. Addresses of companies listed on these pages may be found by consulting their advertisements in this issue.

Absorption and Compression Plant Equipment
Baker Iron Works.
C. F. Braun & Co.
Chaplin-Fulton Mfg. Co.
J. A. Campbell.
Jensen Instrument Co.
Southwestern Engineering Corp.
The E. A. Key Company
Western Pipe & Steel Co.

Absorption Towers
Baker Iron Works.
C. F. Braun & Co.
J. A. Campbell.
S. Herbert Lanyon
Southwestern Engineering Corp.
Steere Engineering Co.
Western Pipe & Steel Co.

Abrasives
Abrasive Engineering Corp'n.

Acetylene, Dissolved
Commercial Acetylene Co.

Adjustable Plugs
Lattimer-Stevens Co.
Western Pipe & Steel Co.

Agitators
Baker Iron Works.
Western Pipe & Steel Co.

Aluminum Bronze Powder for Paint
Hill, Hubbell & Co.
The Paraffine Co.s, Inc.

Analyzers
C. F Braun & Co.
Smith-Emery Co.

Annealers (Bar, Blank, Strip)
Pacific Meter Works.

Anti-Fluctuators
Pacific Meter Works.

Apparatus, Experimental Gas
The Alpha-Lux Co., Inc.
Pacific Meter Works.

Appraisals and Valuations
Smith-Emery Co.

Aqua Ammonia Apparatus
Steere Engineering Co.

Automobile Tires
Truck Tire Service Co.

Bags, Gas Main
Connelly Iron Sponge & Governor Co.
Mueller Co.
Safety Gas Main Stopper Co.

Barometers
Jensen Instrument Co.
Westcott & Greis, Inc.

Bench Iron Work
General Gas Light Co.

Benzol, Recovery Apparatus
Steere Engineering Co.

Bins, Storage (ash, coal, coke)
Steere Engineering Co.

Blast Gates
Montague Pipe & Steel Co.
Steere Engineering Co.

Blocks and Tiles, Fire Clay
The Alpha-Lux Co., Inc.
American Refractories Co.
Los Angeles Pressed Brick Co.
Steere Engineering Co.
Stockton Fire Brick Co.
S. Herbert Lanyon.

Blowers and Boosters
Ingersoll-Rand Co.

Blowpipes
Montague Pipe & Steel Co.

Boiler—Brickwork
J. N. J. Firebrick Co.

Boiler Equipment
E. A. Key Co.

Boiler Maker's Tools
E. A. Key Co.

Boilers, Gas-Fired
Baker Iron Works.
Montague Pipe & Steel Co.

Boiler Settings, Pipe and Boiler Insulation
S. Herbert Lanyon.
Pioneer Paper Company.
J. T. Thorpe & Son, Inc.

Boilers, Waste Heat
Baker Iron Works.

Boilers, Water Tube
Baker Iron Works.
Montague Pipe & Steel Co.
Southwestern Engineering Corp.
Western Pipe & Steel Co.

Boxes
Baker Iron Works.
Steere Engineering Co.

Brass (rods, sheets, tubes, wire)
Mueller Co.

Breakers
Ingersoll-Rand Co.

Breeching (Boiler and Stack)
Western Pipe & Steel Co.

Brick, Firebrick
Abrasive Engineering Corp'n.
The Alpha-Lux Co., Inc.
American Refractories Co.
Los Angeles Pressed Brick Co.
S. Herbert Lanyon.
J. T. Thorpe & Son, Inc.
Steere Engineering Co.
Stockton Fire Brick Co.

Brick, Firebrick—Installation
J. N. J. Firebrick Co.

Brushes, Wire Pneumatic
Abrasive Engineering Corp'n.
Ingersoll-Rand Co.

Buildings, Steel
Baker Iron Works.
Western Pipe & Steel Co.

Bunkers, Steel and Concrete
Western Pipe & Steel Co.

Burners, High Pressure
S. Herbert Lanyon.
Lee B. Mettler.
Rotary Manufacturing Co.

Burners, Low Pressure
General Gas Light Co.
S. Herbert Lanyon.
Lee B. Mettler.
Payne Furnace & Supply Co.
Rotary Manufacturing Co.

Burners—Oil
Rotary Manufacturing Co.

By-product Recovery Apparatus
Oliver Continuous Filter Co.
Steere Engineering Co.

Calorimeter Accessories
Pacific Meter Works.

Calorimeters
The Alpha-Lux Co., Inc.
Pacific Meter Works.

Cases, Meter
Pacific Meter Works.
Pittsburgh Meter Co.

Casinghead, Gas Meters
Jensen Instrument Co.
Pacific Meter Works.
Pittsburgh Meter Co.
The Foxboro Co., Inc.

Casing and Tubing (steel)
Montague Pipe & Steel Co.
Steere Engineering Co.
South Chester Tube Co.

Casing—Iron
South Chester Tube Company

Cast Iron Pipe
Steere Engineering Co.
United States Cast Iron Pipe and Foundry Co.

Castings
Philadelphia Steel & Iron Co.
Steere Engineering Co.
United States Cast Iron Pipe and Foundry Co.

Cement
Abrasive Engineering Corp'n.
Stockton Fire Brick Co.

Cement, High Temperature
Stockton Fire Brick Co.

Cement—Plastic
Pioneer Paper Company.

Centrifugal Pipe
United States Cast Iron Pipe and Foundry Co.

Charging Machines (retort, etc.)
Steere Engineering Co.

Checker Brick
Abrasive Engineering Corp'n.
American Refractories Co.
Los Angeles Pressed Brick Co.
Steere Engineering Co.
Stockton Fire Brick Co.

Chemical and Gas Testing Apparatus
The Alpha-Lux Co., Inc.
Pacific Meter Works.
Westcott & Greis, Inc.

Chemists, Analytical
Smith-Emery Co.

Chimneys, Radial Brick
American Refractories Co.
Los Angeles Pressed Brick Co.
Stockton Fire Brick Co.
J. T. Thorpe & Son, Inc.

Chimneys, Radial Brick Installation
J. N. J. Firebrick Co.

Chutes (coal, coke, ash)
Steere Engineering Co.
United States Cast Iron Pipe and Foundry Co.

Clamps and Sleeves, Pipe
Mueller Co.

Clamps, Service
Mueller Co.

Cleaners, Service
Pacific Meter Works.

Coal Gas Plants
Steere Engineering Co.

Coal Tar Products and Chemicals
The Paraffine Co.s, Inc.

Cocks
Lattimer-Stevens Co.
Merco Nordstrom Valve Co.
Mueller Co.
Geo. D. Roper Corporation.

Coils and Bends
Philadelphia Steel & Iron Co.

Collectors, Dust
Western Pipe & Steel Co.
Steere Engineering Co.

Compressors, Air
The C. & G. Cooper Co.
Ingersoll-Rand Co.
Oliver Continuous Filter Co.
Robertson & Company.

Compressors, Gas
The C. & G. Cooper Co.
Ingersoll-Rand Co.

Compressors, High Pressure
The C. & G. Cooper Co.
Ingersoll-Rand Co.

Compressors, Portable
Ingersoll-Rand Co.
Robertson & Company.

Condensers
Baker Iron Works.
C. F. Braun & Co.
Ingersoll-Rand Co.
S. Herbert Lanyon.
Southwestern Engineering Corp.
Steere Engineering Co.

Condenser Boxes
Baker Iron Works.

Condenser Tubes
Steere Engineering Co.

Cooling Systems, Towers
C. F. Braun & Co.
Steere Engineering Co.
Southwestern Engineering Corp.

Controllers
Jensen Instrument Co.
The Foxboro Co., Inc.

Controlling Devices, Electric
L. R. Teeple Co.

Controls, Air and Steam
Jensen Instrument Co.
S. Herbert Lanyon.
C. F. Braun & Co.
The Foxboro Co., Inc.
S. Herbert Lanyon.
Steere Engineering Co.
L. R. Teeple Co.

Cooling Systems
S. Herbert Lanyon.
Steere Engineering Co.

Cooling Towers
C. F. Braun & Co.
J. B. Gill Corporation.
Southwestern Engineering Corp.
Steere Engineering Co.

Counters, Revolution
Jensen Instrument Co.

Couplings
Pittsburgh Meter Co.

Coverings (Tank, Boiler, Cold and Steam Pipe)
The Paraffine Co.s, Inc.
Pioneer Paper Company.

Cubic Foot Bottle
Pacific Meter Works.

Cutters, Pavement
Ingersoll-Rand Co.
Robertson & Company.

Cutters, Pavement
Ingersoll-Rand Co.

Cylinders, Compressor
The C. & G. Cooper Co.
Steere Engineering Co.

Dephlegmaters
C. F. Braun & Co.
Southwestern Engineering Corp.
Steere Engineering Co.
Western Pipe & Steel Co.

Diaphragms, Meter
Chaplin-Fulton Mfg. Co.
Pacific Meter Works.
Pittsburgh Meter Co.

Diggers, Clay
Ingersoll-Rand Co.
Robertson & Company.

Discharging Machines (retort, etc.)
Steere Engineering Co.

Displacement System, Tar
Steere Engineering Co.

Ditcher
Robertson & Company.

Door, Clean-out
Baker Iron Works.
Steere Engineering Co.

Drills
Ingersoll-Rand Co.
Mueller Co.

Drill Pipe—Iron
South Chester Tube Company

Drill Pipe—Steel
South Chester Tube Company

Dryers
Payne Furnace & Supply Co.

Elevators
Baker Iron Works.

Engineers and Engineering Service
J. B. Gill Corporation.
Smith-Emery Co.
Southwestern Engineering Corp.
Steere Engineering Co.
Western Pipe & Steel Co.

Engines
The C. & G. Cooper Co.
Ingersoll-Rand Co.
Western Machinery Co.

Engines, Diesel
The C. & G. Cooper Co.
Western Machinery Co.

Engines, Gas
The C. & G. Cooper Co.
Ingersoll-Rand Co.
Western Machinery Co.

Engines, Oil
The C. & G. Cooper Co.
Ingersoll-Rand Co.
Western Machinery Co.

Engines, Steam
Ingersoll-Rand Co.

Evaporating Apparatus
C. F. Braun & Co.
United States Cast Iron Pipe and Foundry Co.
S. Herbert Lanyon.
Southwestern Engineering Corp.

Excavators, Ditch and Trench
Robertson & Company.

Exchangers, Heat
Baker Iron Works.
C. F. Braun & Co.
S. Herbert Lanyon.
Southwestern Engineering Corp.
Steere Engineering Co.
Western Pipe & Steel Co.

Exhausters
Ingersoll-Rand Co.
S. Herbert Lanyon.
United States Cast Iron Pipe and Foundry Co.

Experimental Apparatus
S. Herbert Lanyon.
Pacific Meter Works.

Extractors
Steere Engineering Co.

Extinguishers, Fire
American La France Fire Engine Co.

Faucets, Drain
Mueller Co.

Felt—Deadening
Pioneer Paper Company.

Filters
S. Herbert Lanyon.
Oliver Continuous Filter Co.
United States Cast Iron Pipe and Foundry Co.

Fire Clay and Products
The Alpha-Lux Co., Inc.
American Refractories Co.
S. Herbert Lanyon.
Los Angeles Pressed Brick Co.
Stockton Fire Brick Co.

Fire Brick Contractors
J. T. Thorpe & Son, Inc.
Stockton Fire Brick Co.

First Aid Equipment
American La France Fire Engine Co.

Fittings
Hoffman Supply Co.
Philadelphia Steel & Iron Co.
Steere Engineering Co.
United States Cast Iron Pipe and Foundry Co.

Fixtures, Lighting (Domes, Portables, etc.)
Welsbach Company.

Flashlights and Batteries
The Paraffine Co.s, Inc.

Feed Water Heaters
C. F. Braun & Co.
S. Herbert Lanyon.
Southwestern Engineering Corp.

Fire Brick
Abrasive Engineering Corp'n.
The Alpha-Lux Co., Inc.
American Refractories Co.
S. Herbert Lanyon.
Los Angeles Pressed Brick Co.
Stockton Fire Brick Co.
Steere Engineering Co.

Flanges
Hoffman Supply Co.
Montague Pipe & Steel Co.
Philadelphia Steel & Iron Co.
Pittsburgh Meter Co.
Steere Engineering Co.
Westcott & Greis, Inc.

Floodlights
S. Herbert Lanyon.

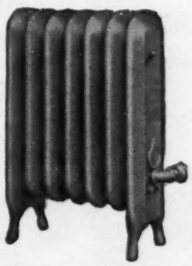
POTTER Heating

For many years POTTER Engineers have pioneered the way in the advancement of modern Gas Heating Systems. They have developed Gas Heating to such a degree of perfection that today, POTTER Products have become a standard of comparison wherever dependable, safe, economical and healthful gas heating is discussed.

OUR BEST ASSET

The tens of thousands of satisfied customers that our Organization has made through POTTER Gas Heating installations, is a JUST tribute to a satisfactory product—a gratification to conscientious effort.

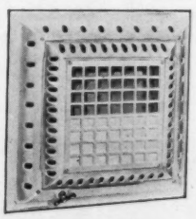
THERE ARE MANY REASONS WHY IT IS BETTER TO INSTALL POTTER SYSTEMS



"POTTER" Vented Radiators

Only POTTER has these 7 POTTER Features (Cast Iron and Steel-Made)

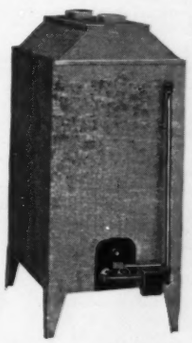
1. Condensation abolished. This does away with corrosion. Many years are added to the life of the Radiator.
2. Triple Circulation. The heat goes into the room, not up the flue.
3. Uniform warmth distribution. The air is never "cooked."
4. Quick heat. No other radiator heats so quickly as the light, efficient POTTER Steel-Made.
5. Aristocratic appearance. The POTTER Cast Iron Radiator is selected for the finest and largest homes.
6. Totally odorless always.
7. Not expensive.



"COLE" Floor and Wall Heaters

Made in heavy solid cast aluminum.

COLE is the only furnace manufactured that can be installed on either the first or second floor.



"MAGIC WAY" FURNACES

"MAGIC WAY" was the first, and has always been considered the leading Unit System of heating.

The principle of Unit Heating of modern buildings, brought to its present state of refinement through the study and efforts of this Organization, is based on the principle of an individual furnace or heater for each room or group of rooms to be heated.

This type of installation allows accurate temperature control in each room, regardless of the demand in other sections of the home.

POTTER quantity production now makes "MAGIC WAY" with electric controls, available to anyone who desires a gas furnace system.

The same features that make these well known POTTER-made appliances favorites with home builders and home owners, make them popular with churches, schools, theatres, auditoriums and factories.

The low cost of adequate heating by means of "MAGIC WAY" Vented Furnaces of either the Unit or Central Plant type, will be a revelation.

"MAGIC WAY" VALVES

By merely pressing a button, the temperature of any room may be regulated. This valve not only turns the heat on but it regulates the heat to suit your exact wants.

"MAGIC WAY" Floor Furnace

When the furnace type of heat is desired at low cost or when a basement is not available, use "Magic Way" Vented Floor Furnaces.

Potter Heating Includes:

"MAGIC WAY" UNIT FURNACES
"POTTER" GAS RADIATORS
"STEEL-MADE" GAS RADIATORS
"COLE" FLOOR AND WALL FURNACES

There Is a **POTTER System** for Every Need

POTTER RADIATOR CORPORATION

San Francisco—Oakland—Los Angeles—San Diego

Flooring—Industrial
Pioneer Paper Company.

Floors
Steere Engineering Co.

Forged Steel Pipe Flanges
Philadelphia Steel & Iron Co.

Forgings
Baker Iron Works.
Philadelphia Steel & Iron Co.
S. Herbert Lanyon.
Payne Furnace & Supply Co.
Potter Radiator Corporation.
Pacific Gas Heating Co.
Geo. D. Roper Corporation.
J. T. Thorpe & Son, Inc.

Furnaces, Floor
Electrogas Furnace Co.
Payne Furnace & Supply Co.
Pacific Gas Heating Co.
Potter Radiator Corporation.

Furnaces, Lead Melting
Mueller Co.
Payne Furnace & Supply Co.
Potter Radiator Corporation.

Gas Analysis Apparatus
Jensen Instrument Co.
Pacific Meter Works.
The Foxboro Co., Inc.

Gas Meter Stop Cocks and Valves
Lattimer-Stevens Co.

Gas Main Tapping & Drilling Machines
Mueller Co.

Gaskets
Pittsburgh Meter Co.
Safety Gas Main Stopper Co.
Steere Engineering Co.
The E. A. Key Company

Gasket Compound
E. A. Key Co.

Gasometer
Pacific Meter Works.
Steere Engineering Co.

Gas Pipe Line Construction
Robertson & Company.
Steere Engineering Co.
Western Pipe & Steel Co.

Gauges
The Alpha-Lux Co., Inc.
Jensen Instrument Co.
Pacific Meter Works.
Pittsburgh Meter Co.
The Foxboro Co., Inc.
Steere Engineering Co.
Westcott & Greis, Inc.

Gauges, Steam
Jensen Instrument Co.
Steere Engineering Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Gauges, U Type
Jensen Instrument Co.
Lee B. Mettler.
Pacific Meter Works.
Safety Gas Main Stopper Co.
Steere Engineering Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Generators, Acetylene
Commercial Acetylene Co.

Generators, Water Gas
Baker Iron Works.
Steere Engineering Co.

Glassware
Westcott & Gries, Inc.

Governors
Chaplin-Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Pacific Meter Works.
Reynolds Gas Regulator Co.
Sprague Meter Co.
Steere Engineering Co.
Westcott & Greis, Inc.

Hammers
Ingersoll-Rand Co.

Hanger, Meter
Mueller Co.

Hangers, Iron and Steel
Baker Iron Works.
Philadelphia Steel & Iron Co.

Heaters
Baker Iron Works.
C. F. Braun & Co.
General Gas Light Co.
S. Herbert Lanyon.
Pacific Gas Heating Co.
Payne Furnace & Supply Co.
Potter Radiator Corporation.
Welsbach Company.
John Wood Mfg. Co.

Heaters, Floor
Electrogas Furnace Co.
General Gas Light Co.
Pacific Gas Heating Co.
Payne Furnace & Supply Co.
Potter Radiator Corporation.

Heaters, Wall
General Gas Light Co.
Pacific Gas Heating Co.
Payne Furnace & Supply Co.
Potter Radiator Corporation.

Heat Exchangers
Baker Iron Works.
C. F. Braun & Co.
S. Herbert Lanyon.
Southwestern Engineering Corp.
Steere Engineering Co.
Western Pipe & Steel Co.

Heat Interchangers
C. F. Braun & Co.
S. Herbert Lanyon.
Southwestern Engineering Corp.
Steere Engineering Co.
Western Pipe & Steel Co.

Hoists
Ingersoll-Rand Co.
Western Machinery Co.

Holders
Baker Iron Works.

Holders, High Pressure
Baker Iron Works.
Western Pipe & Steel Co.

Hoppers
Montague Pipe & Steel Co.

Hose, Air
Ingersoll-Rand Co.

Hot Plates
Geo. D. Roper Corporation.

Hygrometers
Jensen Instrument Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Incinerators
Baker Iron Works.
S. Herbert Lanyon.
J. T. Thorpe & Son, Inc.
Western Pipe & Steel Co.

Incinerator Brickwork
J. N. J. Firebrick Co.

Indicators
S. Herbert Lanyon.
Westcott & Greis, Inc.

Instruments (Measuring, Testing and Recording)
The Alpha-Lux Co., Inc.
Jensen Instrument Co.
Pacific Meter Works.
The Foxboro Co., Inc.
Steere Engineering Co.
Westcott & Greis, Inc.

Insulating Materials
Beacon Water Heater Co.
The Paraffine Co.s, Inc.
Pioneer Paper Company.
Stockton Fire Brick Co.

Kilns
J. T. Thorpe & Son, Inc.
Western Pipe & Steel Co.

Kilns—Brickwork
J. N. J. Firebrick Co.

Laboratory Supplies
Mueller Co.
S. Herbert Lanyon.
Westcott & Greis, Inc.

Ladles, Hot Metal
Mueller Co.
Philadelphia Steel & Iron Co.

Lamps
General Gas Light Co.
Welsbach Company.

Lighters
Tappan Stove Co.

Lighting Incidentals
Welsbach Company.

Line Pipe—Iron
South Chester Tube Company

Line Pipe—Steel
South Chester Tube Company

Linings—Brickwork
J. N. J. Firebrick Co.

Linings—Car
Pioneer Paper Company.

Lux Material
The Alpha-Lux Co., Inc.

Main, Bags
Mueller Co.
Safety Gas Main Stopper Co.

Mains, Street
United States Cast Iron Pipe and Foundry Co.

Main, Stopper
Mueller Co.
Safety Gas Main Stopper Co.

Mantles, Gas Lighting
General Gas Light Co.
Welsbach Company.

Manometers
Jensen Instrument Co.
Lee B. Mettler.
Westcott & Greis, Inc.

Meters, Air
Jensen Instrument Co.
National Meter Co.
Pacific Meter Works.
Pittsburgh Meter Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Meters, Boiler
Jensen Instrument Co.
Pittsburgh Meter Co.
The Foxboro Co., Inc.

Meters, Burner Test
National Meter Co.
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.

Meters, Cast Iron Gas
National Meter Co.
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.

Meter Connections
Lattimer-Stevens Co.
National Meter Co.
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.

Meters, Complaint
Pacific Meter Works.
Pittsburgh Meter Co.

Meters, Consumers
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.

Meters, Flow
Jensen Instrument Co.
Pittsburgh Meter Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Meters, Fluid
Jensen Instrument Co.
Pittsburgh Meter Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Meters, Gas
Jensen Instrument Co.
National Meter Co.
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.
Westcott & Greis, Inc.

Meters, Gasoline and Oil
Jensen Instrument Co.
Pittsburgh Meter Co.
Westcott & Greis, Inc.

Meters, High Pressure Distribution
Jensen Instrument Co.
Pittsburgh Meter Co.
Pacific Meter Works.
Sprague Meter Co.
The Foxboro Co., Inc.

Meters, High Pressure Iron Case
The E. A. Key Company
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.

Meters, Industrial Consumers
Jensen Instrument Co.
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.
The Foxboro Co., Inc.

Meters, Iron Case
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.

Meters, Laboratory
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.
Westcott & Greis, Inc.

Meters, Large Capacity
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.
Westcott & Greis, Inc.

Meters, Oil
Jensen Instrument Co.
Pittsburgh Meter Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Meters, Orifice
Jensen Instrument Co.
S. Herbert Lanyon.
National Meter Co.
Pacific Meter Works.
Pittsburgh Meter Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Meters, Oxygen
National Meter Co.
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.

Meters, Oxygen and Hydrogen
National Meter Co.
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.

Meters, Prepayment
National Meter Co.
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.

Meter Seals
Lattimer-Stevens Co.

Meter Shelves
Lattimer-Stevens Co.

Meter Swivels and Caps
Lattimer-Stevens Co.

Meters, Station
National Meter Co.
Pacific Meter Works.
Pittsburgh Meter Co.

Meters, Steam
Jensen Instrument Co.
National Meter Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Meters, Test
Pittsburgh Meter Co.
Pacific Meter Works.
Sprague Meter Co.
Westcott & Greis, Inc.

Meters, Water
Jensen Instrument Co.
Pittsburgh Meter Co.
Westcott & Greis, Inc.

Meters, Wet Test
National Meter Co.
Pacific Meter Works.
Pittsburgh Meter Co.

Mixers, Gas and Air
Geo. D. Roper Corporation.
National Meter Co.
Pacific Gas Heating Co.

Oil Condenser Sections
S. Herbert Lanyon.
Steere Engineering Co.

Oil, Diaphragm
Pacific Meter Works.

Oxide
The Alpha-Lux Co., Inc.

Paint
Eclipse Paint & Mfg. Co.
The Paraffine Co.s, Inc.
Everlasting Paint & Sales Co.
Hill, Hubbell & Company.

Paint—Black
Pioneer Paper Company.

Photometers
Pacific Meter Works.

Pilots
Payne Furnace & Supply Co.

Pipe
Steere Engineering Co.
United States Cast Iron Pipe and Foundry Co.
Western Pipe & Steel Co.

Pipe Compound
E. A. Key Co.

Pipe, Copper
Mueller Co.

Pipe Covering
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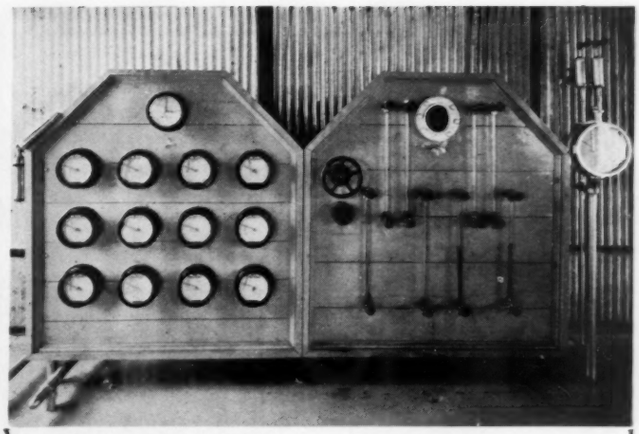

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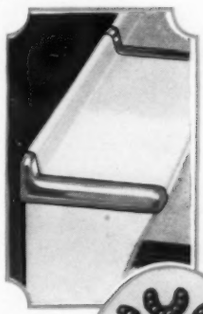

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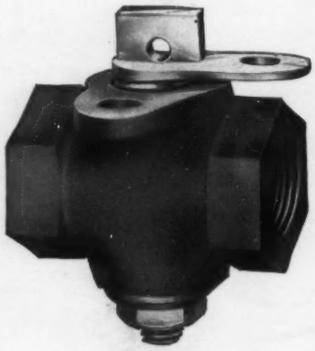

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